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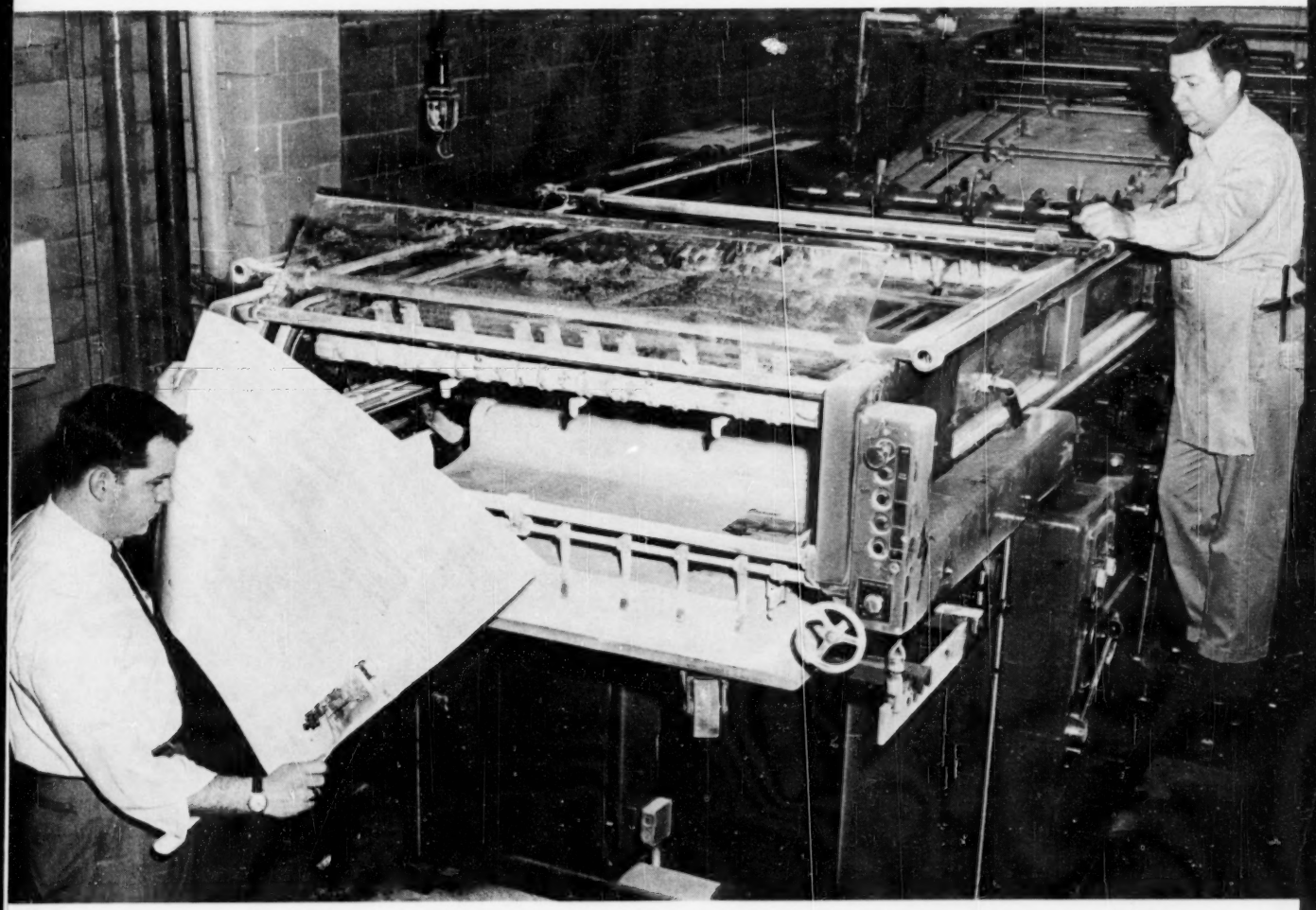

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Editorial

Industrial Education – "An Intruder"

That phase or area in our vast educational program known as Industrial Education has a different meaning and significance to many different people. It has made a tremendous impact on our educational system. Its full signficance has yet to be understood and realized. To those who want to hold on to the traditional type of educational pattern, there is no place for this intruder. To a very few, a complete educational program could be built around a broad concept of Industrial Education.

Industrial Education is relatively easy to define, but somewhat difficult to interpret. Any form or type of education that has for its major objective to develop a better understanding of industry, its products, occupations, skills, its problems, the manufacturing, designing or distribution of the materials and products is a part of Industrial Education.

Although it has a relationship to almost all other areas of our educational system, it is more closely related to math, physics, chemistry, economics, and geography.

Terms used to explain this new area are not well understood by everyone. Industial Arts is a phase of Industrial Education. Its major objective is general education. Selected experiences involving the use of a variety of materials and a wide range of tools and machines in the study of industry, the designing and construction of projects constitute an essential part of this form of Industrial Education. Emphasis is placed on developing an appreciation and understanding of industry involving wide ranges of skills that could be of value to everyone regardless of his future vocation.

The so-called Vocational phase called Trades and Industry is concerned primarily with preparing people to enter employment in the many types of industrial occupations or crafts. It also includes extensive training for those who need additional training where new materials and techniques are involved. A wide range of different types of adult education other than vocational as described above are usually included in a broad interpretation of Industrial Education.

All the products of industry of course have to be disposed of in some manner. Distributive education is that part of Industrial Education that is concerned with the sale of the products of industry.

One of the outstanding features of Industrial Education is its changing nature. It is dynamic, constantly changing and always on the move. It gets its cue from industry.

In many schools the classes in various kinds of Industrial Education are used as a "dumping ground" for those students who cannot succeed in the so-called academic subjects or who are not interested in these subjects.

Guidance workers are usually interested most in the group that expects to enter college. Too often they have had very little experience or preparation that would be of assistance in working with the very large group not preparing for college.

This so-called intruder requires special facilities, teachers with a broad education philosophy who are not afraid of hard work. In spite of all these and many other diffculties, Industrial Education is here to stay and it will continue to grow and become a more dynamic force in the development and improvement of our educational program.

It is not in competition with any other subject or area. It can be justified because it provides not only an enrichment for the traditional program, but also because it provides an education opportunity for a large number of boys and girls who do not care to go to college or enter a profession.

Some of the problems, the difficulties, opportunities, contributions that have been made, conflicting new and basic concepts involved in the area of Industrial Education, are presented in this issue of *The Journal*.

Sylvan A. Yager
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From the Past to the Present with Industrial Education

Sylvan A. Yager

Chairman, Department of Industrial Education, I. S. T. C.

Civilization today represents the struggle of man to control his environment, to develop and use his own ability, to use the resources available for his own security and comfort and to live and work together as individuals and groups in order to provide a richer, a more secure and a happier life.

This struggle has been going on since the early days of recorded history and even before this period when man lived in caves. The progress has been slow until a relatively recent date or as some people might indicate, until the beginning of the industrial revolution.

Most of this so-called progress or development has been largely the result of education in some form. Education, or the organized effort of man to develop human resources and abilities and to provide plans for utilizing these resources and abilities has been a slow process and at no time has there ever existed any assurance of a high degree of success.

Civilization today is complicated and the present age certainly is dominated by technology—or an age of science and industry and speed. An additional item, worthy of mention, is the constant struggle of man to improve and to extend. He does not accept any degree of finality in relation to his achievements in any area of effort. This constant urge to improve, to extend and go beyond has brought man to the beginning of what may be called the space age. The extent to which he succeeds in conquering space will no doubt depend on whether he is able to direct and control his efforts in a cooperative, constructive manner instead of in the direction of a suicidal struggle in conflict with others of his own kind which would probably lead to the destruction of civilization and even to man himself.

This long struggle of man to improve himself has passed through several periods. Only a few of the major developments can be mentioned here as they relate more specifically to Industrial Education.

The cave man and savage were driven by natural urge to seek food to prevent hunger and the urge to provide shelter as a protection from cold and heat. The major asset of the savage was strength, endurance and skill. These provided his greatest source of power over his environment. There were two major divisions or classifications of skill. First, the skill in making the weapons he devised for his own protection and to seek food and to defend himself. Second, the skill in using these weapons. But even in these early times there was another important factor closely related to these two skills. Man had to become acquainted with and understand something about the unlimited kind and type of materials available in order to make the weapons he needed for protection and for securing food.

This third item is represented today in Industrial Education programs in the form of related technical information and in engineering courses as a study of materials and the strength of materials.

Even the savage recognized the limitations of his existence since he was aware of the unseen powers which seemed to be active in nature and he was surrounded by nature "in the raw."

Another very important item concerns the responsibility of the father as the head of the family or the chief of the clan or tribe in passing on to the younger members the skills acquired to provide food, clothing and shelter. Beyond a doubt these must have been acquired by unconscious imitation. As the years passed, the father no doubt gradually assumed a more important position as the head of the family. He then became the one individual responsible for training the younger generation in all they should be able to do.

Man entered another stage of civilization when he gained the power to control fire. Here he passed from a stage of savagery to a stage of barbarism. Thus, man was able to smelt metals and shape them into crude tools and with these tools he was eventually able to engage in a variety of crafts. Here is what might be considered the origin of many of the crafts and tools used in industry and in Industrial Education programs today.

The ability of man to use and control fire in the preparation of food and his limited skill in preparing skins for clothing could possibly constitute the beginning of present day Home Economics courses.

As the years passed there developed the beginning of what is known today as the division of labor. Some men devoted most all of their time to certain specific types of work or crafts such as mining, smithery (metal work), masonry, weaving, etc. These common experiences and this division of labor resulted in the development of new social groups and then guilds, and groups of men who were pursuing the same craft were drawn together. Here may be found the beginning of craft organizations, and later craft unions. At times, certain localities or communities became famous for a certain skill in a single craft.

It is important to understand that learning became a process of conscious imitation but there is no evidence in primitive life to indicate that there was a rationalized process of instruction. However, learning was involved and beyond a doubt there had to be some sequence in what was being taught, although it was routine in nature and no theory was involved. This came later when a variety of circumstances developed and other materials were available. At this point man had to begin a process of simple analysis and this involved considerable trial and error in an effort to establish a basis for selection of the most appropriate materials.

This may have been the humble beginning of what is known today as research and the constant process of experimentation which is so vital to research. As far as teaching is concerned, this may be the simple origin of the process of analysis which is so essential in the constant search for improved methods and the organization of teaching content. In Industrial Education this is referred to as trade analysis.

The ancient Jews believed in education. The first and most important item to develop in every child was a firm belief in God. This was a part of their instruction in the Law. Next to instruction in the Law, was instruction in a trade. The boy attended school in the morning; and in the afternoon, he remained at home and was taught a trade by his father.

In the Talmud, the book of traditionary Law of the Jews, will be found these statements which refer to the responsibility of the parents. "As it is your duty to teach your son the law, teach him a trade." "He who does not have his son taught a trade prepares him to be a robber." "He who applies himself to study alone is like him who has no God."

In other words, failure to give a boy an honest means of earning his living which usually meant to provide him instruction in some manual trade was to prepare him to be a social parasite. However, if the boy learned a useful trade and became skillful in the trade, he was assured of becoming a useful member of society.

In the case of the Jews, the law placed this responsibility for teaching boys a trade upon the parent. This meant, of course, a close relationship between the father, the teacher, and the son, the learner. The earliest records of apprenticeship show the same relationship between the master and the apprentice.

It is interesting to note the following statements in the Babylonian Code of Hammurabi (about 2200 BC): "If an artisan take a son for adoption and teach him his handicraft, one may not begin claim against him." and, "If he do not teach him his handicraft, that adopted son may return to his father's house."

Other quotations from the Talmud would seem to indicate that labor became a religious duty among the Jews. "Great is the dignity of labor, it honors man." "He who derives his livelihood from the labor of his hands is as great as he who fears God." "It is well to add a trade to your studies, you will then be free from sin." Most of the great teachers, for example, were workmen. Hillel was a wood-cutter, Rabbi Joshua was a blacksmith, and others were tanners, carpenters, millers, bakers, tailors, surveyors, cobblers, scribes, etc. In other words, beyond a doubt the Jews believed that a boy who worked with his hands was better off than one who did not and they also recognized that a combination of school and labor at a manual occupation produced useful members of society.

During the Homeric Age in Greece, men who worked in the crafts occupied a place of respect. Later, however, as the Greeks brought more and more slaves to their country, the more menial part of work was performed by slaves and hired labor. This development resulted in a considerable degree of scorn by free citizens toward what was designated as "banausic" (merely mechanical). Artists who worked for pay and whose work depended on handicraft, shoemakers, laborers, smiths and others engaged in the labor of the crafts were all looked upon with reproach.

Socrates believed that those who engaged in banausic arts have no leisure time to devote to their friends or to the state and as a result they were poor defenders of their fatherland. He also stated that this work would ruin the bodies of the men and thus their souls would become much enfeebled.

With this attitude toward handwork on the part of the free citizens of Greece, the manual arts had no place in the education of the youth of the upper classes. A little later boys were taught drawing.

Two factors, however, should be mentioned here. First, the apprenticeship method of instruction which had been handed down from earlier times, continued among the lower classes in Greece; and second, some banausic arts which had been looked down upon by the rich and upper classes were both basic and fundamental to the tremendous material development that was so important in the great civilization yet to come in both Greece and Rome.

Three or four centuries Before Christ there had developed in Greece a prototype of the modern factory system in which certain individuals performed specific kinds of work.

With the years of experience of the Jews and the example of Jesus, the carpenter of Nazareth and his disciples, it is easy to understand the enthusiasm the Christian monks had for manual labor.

Labor was required of everyone. The day was divided between religion and labor. They believed that indolence was the enemy of the soul and that every hour of the day should be regulated. Also that after having celebrated the praises of God seven

times a day, then seven hours of every day should be given to manual labor and two hours to reading. Here again can be seen an early development or relation between the labor or work and the reading or so-called cultural aspects of learning.

The Monastic schools developed and work with the hands played an important part in this development although its primary purpose was not education. These schools became really centers of religion, education and culture.

Outside of the monasteries participation in skilled labor was the principal means of education. Even up to the 19th century most of the people in even the so-called progressive nations received no schooling and any and all of the education they acquired came through their trade or occupation and their social contacts.

In all the comments mentioned above the problem of using time profitably and for the benefit of the individual and society is very evident. The clan, the church, and craft organizations have been involved. Apprenticeship in many forms was used extensively. It is interesting to note that these problems exist today. Youth must be prepared to participate in a still more complex social order. The problem of "how" is even more important today although life to the individual today is no more important than it was to the individual many centuries ago.

The remainder of this article will be devoted to comment concerning the experiments, the various theories, philosophy and work of a few men and organized groups whose contribution seems to be of some significance in relation to the modern program of Industrial Education.

During and following the Protestant Reformation there developed a tremendous interest in learning. This was truly a great period of awakening. Two basic periods of educational concepts were developed which in reality serve as a basis for our modern program of instruction in Industrial Education. The first is that sense impressions are in reality the basis of thought and consequently of knowledge. The second is the related idea of "learning by doing." Out of the first developed what we think of today as the object method of teaching and later the laboratory method. Out of the second came a recognition of the importance of working through an organized procedure or through a process of making something with the hands and tools, or doing something skillfully as a basis for rational thinking. This really provided the incentive for a program of handicrafts in the school, in the workshop and in the field for instruction.

Martin Luther advocated a state-supported, comprehensive education for all children. He referred to monkish tyranny when he said it is an absolute injury to the young; for the children stand in as much need of pleasure and recreation as of eating and drinking. The state would be in charge of this reform which would provide the right kind of schooling for all the people, for both boys and girls and the state was to use compulsion if needed. He would send boys to school one or two hours a day and have them learn a trade at home for the rest of the time.

Rabelais saw an advantage in approaching the abstract and remote through the concrete and near at hand. He thought that manual labor could also serve as a means of recreation.

Mulcaster believed that most of our learning comes through the hand, the eye and the ear. He believed that all children should learn to read and write, but he was also interested in discovering and developing the abilities of the few—which were no doubt the gifted. He is supposed to have been the first to make drawing one of the fundamental studies of the school.

Bacon advocated a philosophy of realism, but he used the term "manual arts" in his first book published in 1605. His belief that all knowledge must be obtained from a careful induction from facts indicates the importance placed upon the experiment.

Comenuis has been called "the father of modern pedagogy." He believed that boys ever delight in being occupied in something, for their youthful blood does not allow them to be at rest. This could be the fundamental idea on which much of the bases for the so-called "activity" programs rest today.

Sir William Petty suggested that industrial occupations be an integral part of the school work. He believed that children would derive great pleasure when given an opportunity to make things with their hands and tools.

Maxon, who was a member of the Royal Society of London, prepared a volume entitled "Mechanic Exercises of the Doctrine of Handy Works." He thought that Manual Arts could profitably be the subjects of the first thought and observations of scholars.

As early as 1685 Thomas Budd proposed a progressive scheme of education for Pennsylvania and New Jersey. He proposed a compulsory system of education for all children, including the Indians. It would include teaching each child that "Art, Mystery or Trade that he or she most delighteth in."

Although the idea of "learning by doing" was accepted by many, it had not been put into operation. The school and the workshop were separate spheres of activity. Manual work or work with the hands was entirely outside the scope of school work since the fundamental educational value had not yet been realized.

Weigel, in his "School of Virtue," used handwork "for the purpose of sweetening the process of learning." This might be somewhat related to the present theories of motivation.

Rousseau believed that experience is the best teacher and he thought

that everything possible should be taught by actions and that we people should say only what they cannot do. He was not clear, however, in the relationship that could be developed between the action and the expression. His belief that manual arts may be a means of mental training marked the beginning of a new area in education.

Many schools of industry sprung up in central Europe, but they all failed in spite of the fact that they provided much help to the children of the lower classes. Lack of funds, poor organization and a lack of enthusiasm on the part of the people contributed to the failure of these schools.

About the same time, a few similar schools were started in America. Some combination of school, religion and teaching of a trade constituted the central theme of these schools. Some involved agricultural pursuits and one, the DeLa Howe State School is still in operation in South Carolina.

Pestalozzi is one of the "greats" in the field of philosophy. He has been called "the father of manual training." He believed that something could and should be done for children of the poor. He believed that children needed continual activity and he suggested using this desire for activity in useful work. He tried to connect study with manual labor, the school with the workshop and make one thing of them.

He loved children and his various experiments with Fallenberg proved that many of his ideas were sound. The sound and economic value of education seemed to be gaining some strength. Froebel began with some of the ideas of Pestalozzi and developed them into his own doctrine of self-activity which became the center of his educational theory. He said that "the young, growing human being should, therefore, be trained early for outer work, for creative and productive activity."

It is of more than passing interest that the New Harmony Educational Experiment in Indiana is a part of the early educational development in this country. Robert Owen brought with him a group of capable men and he proposed to develop a new sociey which would provide an education and employment for everyone.

The Manual Labor Movement in America, the Industrial Schools for Orphans in Germany and England, the Industrial Reform Schools, the Ragged Schools of England and Scotland, and many others contributed to the struggle for some kind of an educational program, mostly for the children of the poor. This movement spread to America and the founding of Gerard College is in some respects an outgrowth of this movement in this country. Hampden Normal and Industrial Institute is another great institution founded on the basic concept that work and labor can and should be a part of a good education.

The Land Grant Act of 1862 known as the Morrill Act, which provided for the establishment of colleges of agriculture and mechanic arts in the different states marks the real beginning of a new area of education in this country.

In the Scandinavian Countries, Educational Sloyd as advocated by Otto Salomon had for its chief purpose to train working men's children to love work and to use their hands as they would be obliged to do in later years.

The Russian System of instruction in the use of tools provided for an organized instructional program based on carefully selected exercises.

These two systems had considerable influence on the early efforts to establish programs of hand work in this country. Expositions such as the Paris Exposition in 1867, the World's Fair in London in 1851, the Exposition at Vienna in 1873, the Centennial Exposition at Philadelphia in 1876, all made a contribution in focusing attention on the possibilities of handwork as a part of education.

Soon after 1870, Calvin M. Woodward, a professor of math at George Washington University in St. Louis introduced the shop work that was later to be called Manual Training. He expected manual training to enrich the curriculum, not to curtail it. At first, Dr. Woodward advocated manual training because it would provide a better start for boys in a variety of industrial occupations. Later, he emphasized more and more the general educational value of manual training regardless of a boy's future occupation.

So many men, so many organizations, so many movements, so many colleges, all exerting various influences have contributed a great deal to the present development of some of the many phases of Industrial Education.

One of the important developments, of course, was the rapid growth of the factory system, which brought about the downfall of the apprenticeship system.

Several years before the turn of the century many colleges and normal schools were offering courses in Manual Training to prepare teachers for this new, fast growing educational subject. At Columbia University it was called industrial training.

A few of the more important organizations and events are listed below: The Industrial Education Association organized in 1884, the National Association of Manual Training Teachers organized in 1891, the Report of the Massachusetts Commission on Industrial Education made in 1906, the National Society for the Promotion of Industrial Education organized in 1906 and the Smith-Hughes Vocational Education Act signed by President Wilson on February 23, 1917.

Scores of prominent men have been interested in and contributed much to the development of various phases of Industrial Education. Any listing of these men should include Nicholas Murry Butler, Charles R. Richards, Samuel Gompers, Frederic G. Bon-

ser, Charles A. Prosser, Lorenzo D. Harvey, Robert W. Selvidge, Charles A. Bennett, Oscar L. McMurray, John Dewey, and many others.

During the period following World War I, no area in our educational system developed more extensively than Industrial Education. Manual Training became Industrial Arts with less emphasis on the development of the industrial pupil through a wide range of experiences with a variety of tools and machines and materials. This program of work today is offered for both boys and girls and it is now finding an important place in the elementary school as well as the junior and senior high school.

The increased emphasis on technological aspects of Industrial Education has resulted in the development of a variety of Industrial Education programs, each organized for a specific purpose.

The industrial technician has established himself as an essential worker in our present day industry. Specific vocational training in the major craft areas requires carefully organized programs of instruction with well-qualified teachers.

Trade extension programs are needed today more than ever.

The cooperative types of programs will certainly be vastly increased in the next decade.

Schools and industry working together, each supplementing the work of the other, will provide essential education and training for a tremendous number of young people and will provide opportunity for enrichment of the educational programs in other areas for many others.

A Total Program of Industrial Education, Industrial Arts, and Industrial Vocational Education

Donald L. Pound

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> Play no longer prepares for the occupational life of the adult, but rather for the uses of leisure. It could be said that the meaning has gone out of the individual's professional (occupational) life precisely because his childish play no longer prepared him for finding the core of his existence in his more constructive contributions to society.—Dr. Bettelheim

Education is often defined as the result of experiences through which one becomes more or less able to adjust himself to the demands of the particular form of society in which he lives and works. This fundamental idea has been generally accepted by teachers at this level of abstraction. However, differences of opinion develop as we reduce this abstraction to the level of concrete practices which lead to effective social adjustment in a democratic society. One can always find an expert or authority to lend support to his own convictions. Industrial and vocational education are in agreement with Lynd's statement to the effect that "One's vocation is the water shed down which the rest of one's life tends to flow." Life and meaningfulness is brought to general education through vocations, vocational preparation and vocational in-service improvement. This whole life adjustment approach has gained considerable acceptance through research findings in psychology in which the approach toward the solution of the total problem was found superior to solution of fragments of the problem.

Industrial Education holds an important responsibility for adjustments to industrial and technical phases of our society in the total problem of life adjustment and learning for all boys and girls.

This responsibility is becoming more and more important with our increasing urbanization and our rapidly advancing technology. Both of these developments are contributing toward further separation of adults' vocational activities from the activities of our children and youth. Parents are hard pressed to find jobs for their children which provide opportunities for practical experience and carrying of responsibility. This predicament has been precisely stated in the following quotation:

Industrial Education encompasses two distinct programs; namely, Industrial Arts Education and Industrial Vocational Education (sometimes referred to as Trades and Industry or T. & I.).

Industrial Arts Education carries primary responsibility for contributing to a balanced program of education. It was conceived as an answer to the problems of educating both boys and girls to live in a society which may be characterized as industrial and technical.

Problem solving techniques applied to industrial type, jobs, tools and materials is an important characteristic throughout industrial arts and industrial vocational education. However, in the lower grades industrial arts activities are used as a means of creating interest and reality for the basic tool subjects. Effective use can make the three R's live. Its aim is also to provide early guidance by teaching the dignity of work through

relationships between industry, home, school and community.

Throughout the junior high school period, grades seven through nine, the program is organized to provide for numerous tryout and exploratory experiences in many phases of our industrial life. This is usually accomplished through a well-organized General Shop program plan which presents many situations and problems paralleling phases of actual industrial experiences. It is suggested in the Indiana Administrator's Handbook, page 218, that at least seven basic areas be considered. The alternative for consideration includes: Graphic Arts (Letter Press, Block Cutting, Silk Screen), General Woods, General Metals (Sheet Metal, Foundry, Welding, Machine Shop), Electricity and Communications (General Electricity, Simple Radio and Television), Transportation and Power (Auto Mechanics), Internal Combustion Engines (Principles of Aircraft and Aeronautics), Planning and Drafting (Mechanical Drawing, Architectural Drawing), Crafts as represented by industries (Textile Weaving, Art Metals and Ceramics).

In grades ten through twelve, the program is organized on a curriculum basis providing for more intensified exploration and guidance and leading toward social adjustment as well as occupational choice. Through group undertakings, employment readiness develops to some degree.

Selection, guidance and decision making are most important within the industrial education program with its extensive array of subject matter and experience areas as they are in the total educational experience. The experience background of those who guide and schedule our children and youth becomes an important factor which may be a blessing to one student and damnation to another (principle of many guidance people with differing backgrounds versus few specialized in guidance).

Dr. Conant recognized this great problem and expressed it as follows:

> Those in charge of each high school have the responsibility for carrying out a most difficult and most important task: namely, providing education for all the youth of the community. The abilities and vocational goals of these boys and girls are spread over a wide spectrum; no one program of studies can possibly be adequate for all. . .

Only too often does the number enrolled dictate the courses offered and the program and facilities provided, and only too often does natural ability become straight-jacketed into the so-called college preparatory program. Decision making is most important and balance for total life adjustment must be the watchword. The following quotation from Dr. Conant is accurate and pointed to this problem.

> There are general high schools in certain types of suburban areas, for example, where vocational programs would fail, because they would not attract enough capable pupils. The programs must enroll a considerable number of better than average pupils (in terms of their academic ability), for the really skilled technical fields require such ability. Also unless enough able students enroll, the vocational programs will suffer, because of the low esteem in which they are held by the student body.
>
> Indeed, a prime requisit for good vocational programs is that these programs be protected by the administration from becoming dumping grounds for those of low quality (those with an I.Q. of less than 90, let us say). This requires an appreciation by the guidance officers of the real significance of the work.

The industrial vocational education program is designed for those students above 16 years of age who have made an occupational choice in one of the industrial pursuits. An intelligent decision on his part at this point should guide him into a program of preparation for occupational entry. It is generally understood that students entering this phase of the industrial educational program will be preparing themselves during the 11th and 12th years in high school by devoting approximately one-half of their school day to the development of ablities, skills, understandings, attitudes, and work habits essential to their chosen trade or occupation, while the other half of their time is devoted to general education subjects to meet high school graduation requirements. This does not close the door for college entrance if the occupational choice is suddenly changed.

Secondary vocational programs are operated as pre-apprentice programs leading toward entry into post high school apprenticeship programs ranging from three to five years of on-the-job training, coordinated with a minimum of 144 hours per year of related technical instruction. On-the-job training is provided within the industry and the related technical instruction is provided in a vocational school. In keeping with the philosophy of public education in Indiana, industrial vocational education provides vocational extension training for the tradesman through his work life. This is vital to successful adjustment and performance in our ever-changing industrial society.

At Indiana State Teachers College the teacher training program in the Industrial Education Department provides opportunities for teacher education in both Industrial Arts and Industrial Vocational Education.

It is becoming more apparent that many of our school corporations are entirely too small to provide for comprehensive industrial education needed in our increasingly technical age for maintaining equality of opportunity for all.

Many states have developed other programs to augment those carried out in the local schools by providing advanced programs on a larger geographical area basis. Some of these areas serve as many as ten to twenty local school districts. Area programs of this type serve grades 11, 12, 13, 14, and other special adult vocational needs, and operate under a separate administrative unit, which places the operation under the direction of high-

ly qualified officials. These schools are called by various names in different areas of our country. They are known as area vocational technical schools, technical institutes, community or junior colleges. In terms of service rendered, they are all very similar. It is obvious that Indiana, with all of its very small high schools, and the limitations of its existing educational framework cannot give the comprehensive type of industrial vocational training or the well balanced general education programs required today. We must consider our offerings since approximately 60-70% of our people find themselves in industry, industrial occupations, or technical pursuits.

We are not fulfilling our constitutional responsibility as educators until we achieve better balance in providing total life adjustment in organized training for a technically developing society.

Case Study Reports on Functions of New and Remodeled Facilities

Overview

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A little over a half century ago a few courses, in what was then called manual training, were started in the basement of the Training School. The Training School was the newest and, in fact, one of the few buildings on the campus of the Indiana State Normal School. This building later became known as Stalker Hall.

The program of work included woodwork, drawing and ceramics; and all the courses were under the direction of one teacher, Mr. M. L. Laubach.

In a few years this new type educational program had outgrown the limited facilities provided for it in the basement of the Training School.

A new building called the Vocational Building was designed and constructed about 1916. The Manual Training program was located on the first two floors of this new building.

Courses in Domestic Science which had previously been offered on a limited scale were expanded and located on the third floor of this new building. About 1921 a vocational teacher training program was added.

This educational area continued to grow, and it later became known as Industrial Arts. The Domestic Science program became Home Economics.

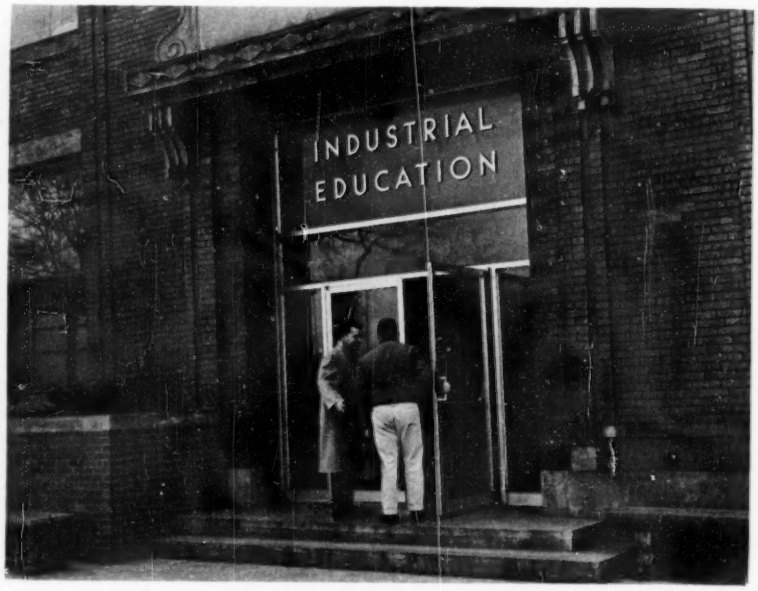
By the close of World War II the facilities in the Vocational Building were inadequate. It was finally decided to build a new building for the Home Economics Department and to remodel the Vocational Building for Industrial Arts. In view of the fact that both Industrial Arts and Industrial Vocational Teacher Training were offered, the department was called the Industrial Education Department.

In developing plans for the remodeling program, it became evident that even the entire Vocational Building was inadequate, so provisions were made to include an addition on the vacant lot west of the building.

Instructional Program Revised

In developing detailed plans for this entire remodeling project, several basic ideas served as guides.

First, keep in mind the important responsibility to provide facilities for



Entrance to Industrial Education Building, I. S. T. C.

a good, modern program of Industrial Education.

Second, selection of equipment that was best suited for a good program.

Third, the reduction of expenditures as much as possible, through utilization of usable equipment on hand.

Fourth, keep in mind the extent to which our remodeled facilities could be of help to the public schools in their efforts to provide new and improved facilities.

Fifth, develop facilities which not only provided for a good program in this area, but one which also allowed for modifications consistent with changing needs in the future.

Sixth, develop plans for this area which were consistent with potential contributions of Industrial Education in relation to all other areas and in relation to a total education program.

The following features were included in the remodeling program:

First, classroom or discussion centers were located on each floor adjacent to major shop areas.

Second, an office was provided for each instructor.

Third, adequate storage facilities were included for student projects and supplies.

Four, an incinerator, with openings on each floor, was installed for disposal of waste materials.

Fifth, an exhaust system was included with openings for floor sweeps and connections to many machines.

Sixth, air outlets were installed in each shop for cleaning and for air tools.

Seventh, six centers with blackout curtain were included for extensive use of Audio-Visual aids.

Eighth, a loading dock was planned for delivery of supplies and equipment.

Ninth, a combination passenger and freight elevator was installed to provide convenient access to both second and third floors.

Tenth, display cases for each floor were constructed to exhibit student work and industrial products and processes.

A large conference suite was located on the third floor and was designed with accordian doors which make it possible to divide the room into three smaller rooms. Adjacent to the Conference Suite and the Student Lounge is a complete kitchen.

Major shop areas have been provided for graphic arts, power and auto mechanics, metals, woods, drafting and electronics in addition to a handicraft shop.

A complete general shop has been included which should assist not only with preparation of teachers for the general shop, but also assist school officials in planning similar facilities for public schools.

In the fall of 1954 steps were taken to develop plans for adequate facilities to meet the needs of the changing technology.

The present facilities indicate the extent of the staff's efforts. The present staff of sixteen instructors is now working hard to make effective use of these splendid facilities in providing a complete program of Industrial Education to serve schools and industry.

Drafting "In Perspective"

Warren Wold

Instructor in Industrial Education, I. S. T. C.

Drafting is often called a universal language. It is a definite system of lines, figures, and conventions used to present ideas and convey exact information that will describe the size and shape of an object.

In looking to the future we can see our society becoming more technical and requiring a greater number of skilled workers, engineers, and scientists. As our way of life changes, the demands for certain subjects increase while others may be rearranged in content and grade level.

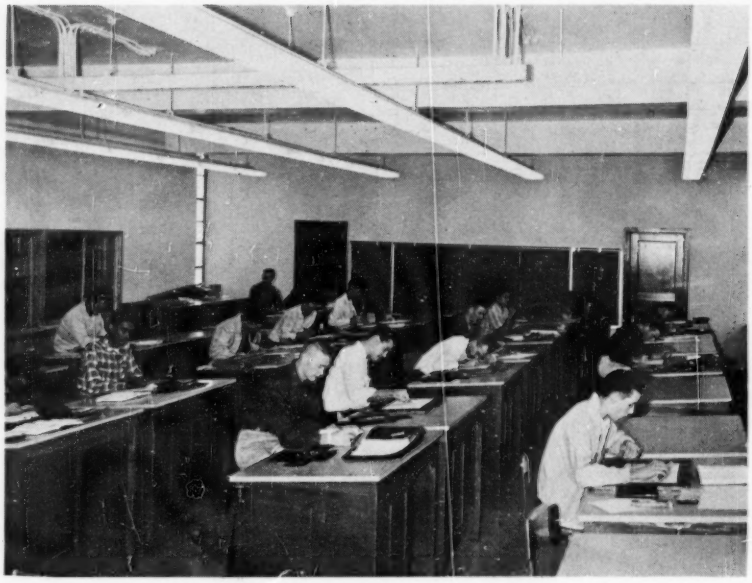
Drafting has undergone changes along with modern society. Many institutions of higher learning have de-emphasized technical drawing while drawing has been stressed in other preparatory programs and in the training of technical workers.

The teacher training institutions must keep abreast with the needs and changes in society. They should be the first to inaugurate new ideas and it should be a center where the new teacher as well as the experienced teacher can get information on new teaching methods, materials and procedures.

The recently remodeled drafting room at Indiana State Teachers College along with a revised curriculum, can better prepare prospective teachers to meet the needs of the future. The new room provides a pleasant atmosphere for drawing. It is located on the second floor with large windows admitting light from the north. The ceiling, walls, and floor are light in color and fluorescent lights provide adequate illumination for drawing. Chalkboards are conveniently located at both the front and the back of the room. Separate rooms are used for supply storage and reproduction equipment. Each student is issued drafting equipment and is provided with individual drawer storage.

The instructional units have been selected to meet the needs of the typical class in training and full consideration has been given to the amount of time available for presenting the course. In order to provide the teaching field with better trained personnel, an analysis has been made of the current instruction carried on in other institutions along with the drafting procedures used in industry.

The training of teachers goes beyond the realms of the class room. The prospective drafting teacher should become acquainted with the many professional organizations through which he can increase his technical knowledge and improve his teaching methods. He should also be encouraged to join and become active in these organizations.



Facilities for Drafting at I. S. T. C.

"Boring Details" of the Metals Area

Harry Barrick

Professor of Industrial Education, I. S. T. C.

A Definition[1]

Industrial Arts is instructional shopwork which provides for all youth sound educational experiences that contribute to the satisfaction of their purposes, needs and wants.

It is an integral part of the general education program of all youth. It offers those learning experiences which assist boys and girls to understand the industrial and technical aspects of life today. It is a curriculum area that makes a realistic contribution to life adjustment education. It shares with other areas of the school the responsibility for development of the good citizen.

The unique contributions of industrial arts are centered mainly around significant aspects of the manufacturing and construction industries and their effects on daily living. Those who participate in industrial arts programs receive orientation in the areas of production, consumption and repair of various types of consumer goods in common use. Through these experiences, young people learn about material goods. They learn how such goods are made, how to use and maintain them intelligently. They develop general skill and resourcefulness in working with things both technical and mechanical. They learn facts, principles and procedures about tools, materials, processes, mechanics, and design. Knowledge is gained about woods, metals, plastics, ceramics, textiles, paper and other industrial materials. Other items of importance that are stressed include: electricity, motors, and engines. Experience in industrial arts serves the interest and concern to all people at home, at work, and in recreation. The learning process involves critical thinking in solving problems relating to these matters.

Industrial arts is organized on a basis which is as representative of modern industry as is possible within practical limits. The program embraces such areas as woods, metals, graphic arts, power mechanics, leather, plastics and ceramics with general drawing and planning included in all of them. These areas of experience should not be regarded as separate subjects, but as areas of experience and segments of the total program.

Purpose

Industrial arts is a part of general education because its content comes from industry (an element of our culture).

As a subject in our schools, it should use as points of departure all phases of industrial life which can be effectively dealt with in the school shop. For example, the materials, tools and processes of industry; science applied to industry; the social

[1] "A Statement of the Place and Function of Industrial Arts in Education" by the Industrial Arts Policy and Planning Committee of the American Vocational Association.

and economic contributions of industry; and the human relation pattern fostered by industry.

Basic Areas

Basic areas include: drafting, electricity and electronics, graphic arts, industrial crafts, metalworking, power mechanics and woodworking. This article is concerned only with the metalworking area.

About one in ten of our working force is either directly or indirectly working with metals. It has been said that metals are the backbone of modern industry. For this reason it is logical to expect schools to provide experiences in this field of work. Many metals lend themselves to all levels of industrial arts work.

Study in metalworking covers a wide range of activities including sheet metal forming, machining, casting, forging, spinning, heat treating, metallurgy and precision measurement.

Indiana State Metalworking Program

Metalwork courses at Indiana State were first organized into unit courses for machine shop, foundry and forging. Sheet metal was added later. As the welding industry progressed this type of work gradually replaced most of the forging.

In the reorganization and remodeling program, the machine shop was up-dated through replacement of obsolete or worn-out equipment and through the addition of some entirely new types. Welding was given a more prominent place in the total metal program. Sheet metal, forging, foundry and bench metal were integrated into a general metals area. A unit shop organization is used for teaching machine shop, welding and precision measurement.

The machine shop machine tools are: 17 lathes, 3 shapers, 4 milling machines, 2 upright drills, 3 sensitive drills, power hack saw, metal cutting band saw, 3 grinders and miscellaneous small tools.

It is possible for a student to enroll for as much as 8 semester hours of this work.

A flexible program is required because students have such varied backgrounds from schools and industry. Every effort is made to fit the work to their individual needs.

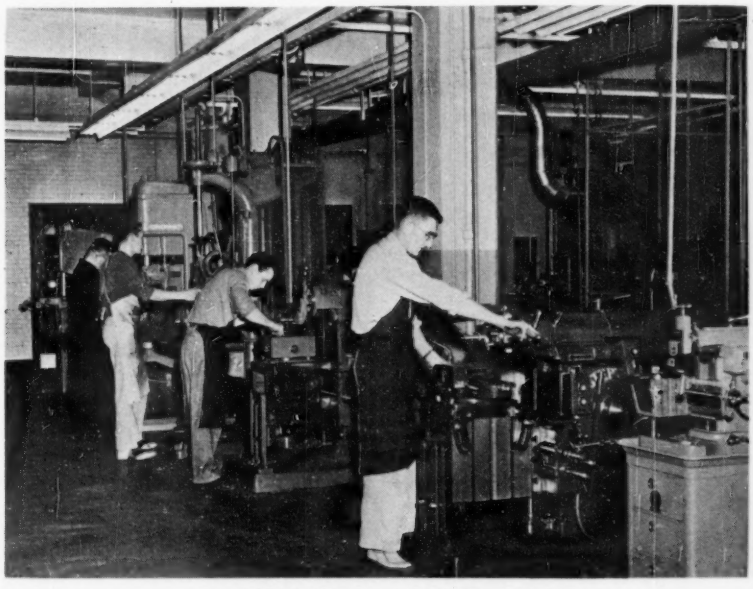
These courses provide basic experiences on all the machine tools previously mentioned with additional opportunity for the most advanced students to do gearing, tool and die work, heat treating and more difficult machining operations.

Welding is a 4 semester hour course which provides instruction in theory and opportunity for practice of electric-arc and oxy-acetylene welding. The electric-arc course includes a series of exercises designed to develop and to gain knowledge concerning fundamental weld joints on steel, cast iron and aluminum. A study of the equipment, metallurgy and heli-arc is also included. The oxy-acetylene instruction includes: fusion welding exercises on typical steel joints, bronze welding steel and cast iron, silver soldering, aluminum welding and soldering and flame cutting. One of the unique features of the physical set up of the welding area is a large size booth for demonstration purposes. This booth provides space for observation from outside as well as inside by the use of shaded glass windows.

General metal includes: sheet metal, bench metal, forging and foundry. Sheet metal involves both hand and machine processes and includes soft soldering, aluminum soldering and silver soldering. The bench metal area offers experience with cold forming of steel, drilling, tapping and riveting. Forging provides experience in hot working and forming of soft low carbon steels as well as high carbon tool steels. Some attention is given metallurgical experimentation. The foundry area is primarily concerned with making molds and with melting and pouring aluminum.

The precision measurement course provides opportunity for the student to study about and use practically all the common measuring instruments used by the metalworking industry.

Most of the students who take metal as a subject are planning to become junior and senior high school industrial arts teachers but others plan to teach vocational subjects.



Metal Shop at I. S. T. C.

Certain courses are open to those who wish an elective, such as, pre-engineering students, and to people from industry who wish to upgrade themselves.

The industrial education staff recognizes the importance of keeping courses and facilities current with new developments. It can be safely forecasted that many changes will be made in the metals program as this industry is rapidly developing new techniques, procedures and equipment.

"Tuning Up" for Expanded Program of Auto Mechanics

William O. Turner
Instructor in Industrial Education, I. S. T. C.

Auto mechanics programs in the public schools of Indiana are not new, but they have been slow to expand outside of the larger cities. The consolidation movement and the school building construction programs are proving to be a boon to expansion of auto mechanics training facilities. Local planners were foresighted in this respect and included auto mechanics facilities in the new construction plans.

The Industrial Education staff of Indiana State Teachers College realized the approaching need of educators and has taken steps to provide qualified teachers in this area.

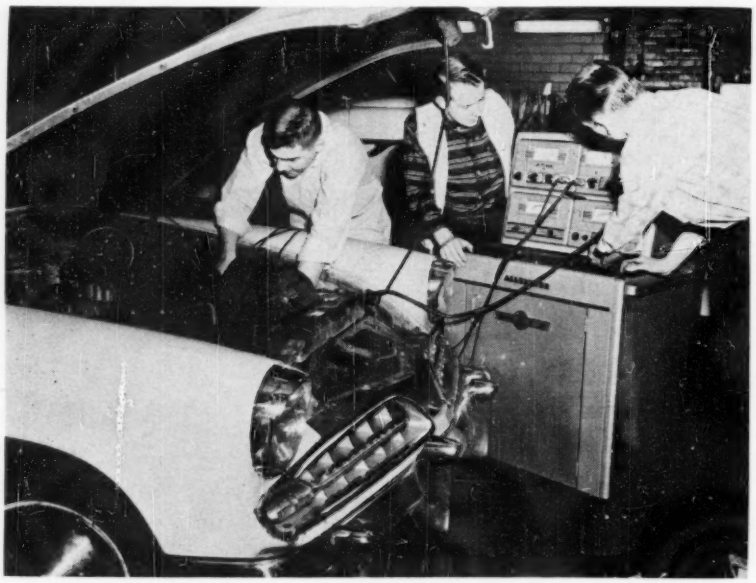
Power and auto mechanics training is now offered as a part of the Industrial Education curriculum at Indiana State. The newly constructed and well-equipped shop affords students an opportunity to secure training in power mechanics and automotive servicing.

Power and auto mechanics, refrigeration, radio and television, and other such area differ from many of their Industrial Education counterparts in that they are a service-type training which requires the learner to have extensive knowledge of his field. The trainee must know the theory and the scientific principles behind the equipment which he plans to repair. He must also be familiar with the particular construction practices which are characteristic of each individual manufacturer, operational knowledge of the various machines and principles and practices involved in use of testing equipment.

There is little opportunity for creativeness or for originality in this field of service work. To be sure, a good mechanic must be resourceful and may modify the products with which he works to suit his needs but he rarely gets to the point where he is allowed to create from his own ideas. It is in this respect that the auto mechanics area differs from other areas. The auto mechanic must test, disassemble, adjust, rebuild, replace, reassemble, and retest before his services are complete. These services are functional rather than creative and often lack glamour because no project or new product is involved.

At the present time there are two general types of auto mechanic programs offered in the public high schools; firstly, the vocational auto mechanics, and secondly the industrial arts power and auto mechanics. The latter might be thought of as a technical program which contributes to the training of technicians as well as to the development of consumer knowledge.

The high school vocational auto mechanics program is aimed at training competent high school graduates who may enter occupations in the automotive repair field. It should be emphasized that the vocational high school program will not produce a completely trained and experienced mechanic. The trainee will have the technical background which will enable him to enter an occupation and advance to successful craftsman through in-service training and on-the-job training. The contribution of the auto mechanics program at



Auto Mechanics facilities at I. S. T. C.

Indiana State will provide teachers with a technical background and will qualify them as vocational instructors if they have the necessary work experience.

Floor space accounts for much of the initial cost for a power and auto mechanics program. Approximately 200 square feet of space is required for each auto service stall. In addition to this, there must be space for laboratory, equipment and discussion areas. If the facility is carefully planned, the stall areas can also be utilized for display or demonstration areas on special occasions. Equipment is not extremely costly and can be added as the program is expanded. However, if funds are adequate it is best to start the program with a completely equipped shop.

Auto mechanics has proved to be one of the most popular areas offered in adult and evening trade extension programs. Since the "Do It Yourself" trend has engulfed the American public, these courses will undoubtedly continue their popularity.

Industrial Arts for the Elementary Grades

John O. Conaway

Associate Professor of Industrial Education, I. S. T. C.

In the remodeling and expanding of the facilities for Industrial Education on the Indiana State campus, the needs of the students enrolled in elementary education for Industrial Arts experiences were considered.

The Industrial Education Department developed a carefully planned Industrial Arts Shop equipped to give the students enrolled in elementary education an opportunity to gain first-hand experience with many of the industrial materials and processes, utilizing a variety of the common hand tools. In the Industrial Arts shop the elementary student teachers are encouraged to develop and experiment with constructive activities which grow out of the subject areas taught in the elementary grades, and which may be useful in expanding the experiences of elementary school children.

Industrial Arts construction activities in the elementary school are based upon precedents dating back to the early nineteenth century in the history of schools in the United States.

Industrial Arts for Elementary Teachers at I. S. T. C.

Industrial Arts for elementary grades consists of construction activities which are a part of the common learnings of elementary children. It contributes to the child's personal development and helps the child to better understand his industrial environment. Usually the acitivities, involving hand tools and common materials, take place in the classroom under the direction of the elementary teacher. Some schools provide a special room for work on individual or group projects which cannot be completed in the classroom. Specially trained consultants or resource teachers are often employed to work with the teachers and the pupils.

Elementary Industrial Arts is defined as informational and manipulative work offered in the first six grades, involving tools, materials, processes, and products of industry as they relate to the home and community life. A second part of the definition considers the procurement and use of the form utilities of life, such as food, clothing, shelter, tools and machines, records and utensils, and the service utilities of transportation and communication.

Industrial Arts in the elementary grades is one avenue leading to generally accepted goals of modern elementary education.

The unique contribution of Industrial Arts at this level is that of

providing first-hand experiences with processes and products of construction, endeavor with materials and with simple industrial tools. It also offers an opportunity for the children to work in democratically formed groups, to experience and to develop understandings of democratic principles.

The manipulative and constructive activities inherent in the content of Industrial Arts have long been recognized by educators as some of the most effective experiences to the learning processes of children.

An evolving concept of Industrial Arts as an integral part of the elementary school curriculum considers Industrial Arts activities as those concerned with people and the use of tools and materials to raise the level of living. This is accomplished through observation and experimental use and study of tools, processes, and materials which man uses to meet his every day needs. This can be effective in helping children to adjust to a rapidly changing technical culture, by providing appropriate experiences in some of the basic craft processes of industry. These activites give children real first-hand experiences through a multi-sensory approach to education.

Industrial Arts contributes to elementary education by offering an opportunity for expanding the experiences of the child in social studies, health, science, math, language and other subject areas, through construction activities which grow out of the subject area taught in the elementary grades.

A most important contribution consists in reducing the level of abstractness thereby making it easier for elementary children to understand through direct and purposeful experiences with the material about which they are studying.

In the elementary grades the Industrial Arts activities are the responsibility of the classroom teacher. The preparation of the classroom teacher becomes the key to program success. Through experience, many teachers have incorporated such work into their elementary programs. Pre-service, in-service, and extension service courses and assistance are available to elementary teachers from the Industrial Arts Department of the teacher training institutions and the Industrial Arts teachers of the public schools.

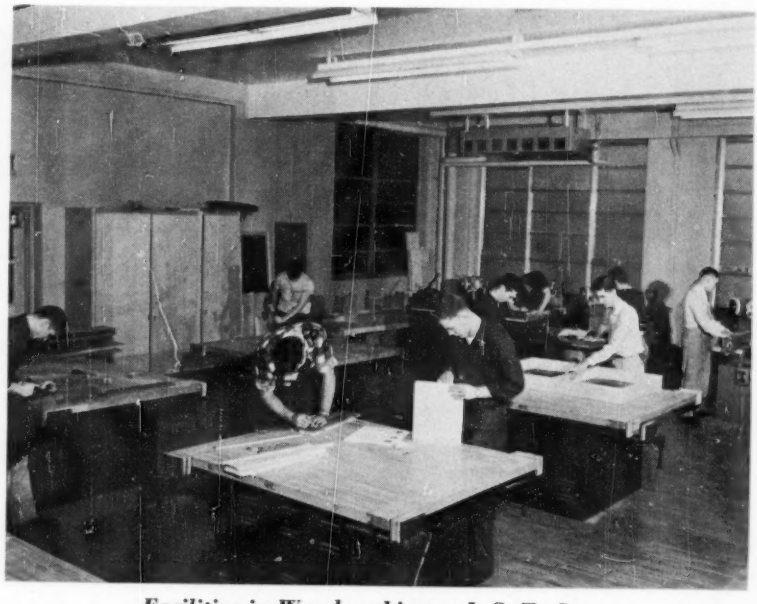
"Plane Facts" from the Woods Area

Ethan A. Svendsen
Assistant Professor of Industrial Education, I. S. T. C.

The word "remodel" has been used frequently in referring to the building and refurnishing of the physical plant for industrial teacher education. For the purposes of this brief discussion of the general woods area, "renovation" is a better choice. The word denotes not only the physical change but, in addition, is more accurately indicative of a change in the theoretical approach made to education involving wood and wood technology in an industrial society. The physical renovation reflects prior thought and anticipation of the educational philosophy supporting a revitalized theory and practice in industrial education.

Since its inception in the form of manual training, industrial education has given a prominent place to wood in industrial learning activities. Even in its liberalizing phases the content of industrial education was originally derived from an analysis of woodworking trades. The resulting programs took on all the characteristics of miniature trade courses in woodworking skills and technical information that existed to be taught and learned as such.

Teacher education programs reflected this in the division of instructional activities into such courses as hand woodworking, pattern making, upholstery, wood finishing, cabinet making, carpentry, and wood turning.



Facilities in Woodworking at I. S. T. C.

Formerly there was apparent justification for this kind of organization. It was accepted as a common element in the preparation of all potential teachers whether they were to teach industrial subjects as general education or as vocational industrial training. The basic theory of industrial education supported a trade approach to the study of wood in the total program of industrial education.

Doubt that this is adequate at the teacher education level has arisen in some quarters. The federal vocational acts made mandatory several years of trade experience for teachers of vocational industrial education. This seems to obviate emphasis upon systematic skill development in the wood area and allows a substitution of study and experiences which make contributions to understanding the principles of science, mathematics, and mechanics basic to the trade or vocation. What would otherwise be a narrow view can be thus broadened, deepened, and made more significant. More meaning can be attached to motor skill and to bare technical fact.

However, additional experience designed to result in skill, in knowledge, and in the attitudes associated with the prevalence of wood in modern culture is necessary for most of a larger groups of majors in industrial education who have vocational plans for teaching industrial arts. To meet this requirement the removal of partitions in the old building to provide one large room in the new suggests symbolically and in actual fact a rejection of the learning approach according to which small segments of the larger area are isolated and studied. This and other physical changes imply an acceptance and promotion of the theory which would maintain wholeness as the context for vital educational experiences. An evolving view of industrial arts education as general education regards the wood industries in their totality as potential subject matter. Content is derived as needed in the educational process from any of the wood trades or from any industrial element of this whole. (This may be applied comprehensively to the whole of industrial arts education as it operates in the general shop form of organization). The installation of modern hand processes that have been outmoded by the possibilities of machines, and the provisions made for activity with and study of forest products other than the natural wood are additional reflections of a change in theory.

The importance of wood in industry has been reduced by the advent of metals and numerous synthetic materials with resultant new designs and methods of fabrication. But wood still represents an important aspect of our industrial surroundings as casual observation will validate. Many complex products exist which involve no trace of wood, but the qualities of wood recommend it above other materials for many applications. And even though its use as a material directly applicable to the manufacturing of products has decreased, the results of research have restored its importance as the source of a myriad of products indispensable to our way of living. It is into this area of the wood industries that industrial education must explore.

Industrial arts in junior and senior high school should not be a series of skills and lists of technical facts to be formally presented and dutifully learned. Rather it should be an opportunity for learning and development to take place in response to the requirements of real life problems with which the students struggle under competent teacher guidance. The elements of the solutions will, of course, include the acquisition of skills and information and much more. Solutions will require an intellectual involvement much less apt to take place under more authoritarian procedures. Such experience in handling technical problems make subsequent problems, manipulative or non-manipulative, easier to solve. Such education does not thwart the possibilities for realizing aesthetic qualities which latently exist within every experience.

At the teacher-education level certification requirements, a realistic appraisal of the demands of many school employments, the limits of time, and the very fact that teacher education is a vocational program of study do not allow exact duplication of those conditions desirable at the high school level. But, within the restrictions mentioned, some shift in emphasis is required and is being accomplished.

The Comprehensive General Shop "Three Ring Circus"

Harold J. Snidow

Associate Professor of Industrial Education, I. S. T. C.

The title as stated above may, at least for some people, give an impression that the comprehensive general shop is a center for sound and confusion having entertainment as its major purpose. Those who are concerned with the continued development of the general shop concept as a vital component of industrial arts in the public schools would give an entirely different meaning to the parenthetical term "three ring circus" contribution to the interpretation and as applied to general shop activities. It is fitting and proper that we should

General Shop facilities at I. S. T. C.

have considerable sound in a shop, and a degree of entertainment is not objectionable. However, the true similarity to a three ring circus is found in the numerous exciting and challenging activities going on in such a shop, all making an education contribution to the intergretation and understanding of this industrial culture in which we live.

The new comprehensive general shop at Indiana State Teachers College, completed in 1957, may be regarded as somewhat of a model of its kind. This shop provides more opportunities for wide and varied shop experiences than would be found in the average general shop in the public schools of Indiana, but no implication is intended that all the shop areas represented here are necessary to insure a good and successful program.

The eyes of boys and girls open wide in keen anticipation and wonder, much as they might at a circus, when for the first time they enter a general shop such as the one at Indiana State, or a reasonable facsimile of it. Indeed, it is better than a circus because here they are actual participants in adventure and not merely passive observers of it.

Rather complete facilities for the following major activity areas have been provided: leathercraft, ceramics, metal work, electricity, lapidary, drawing and planning, graphic arts, woodwork and photography. Several of these major activites may be divided into a number of divisions complete unto themselves. Metal work, for example, includes sheet metal, art metal, foundry, bench metal, metal spinning and lathe work.

All this is a far cry from the older industrial arts programs for both junior and senior high schools in which woodwork and drawing, or even woodwork alone, constituted the entire offering. Let is be understood that there is no intention here to denounce the inclusion of woodwork and drawing facilities in the general shop. Indeed, they are essential elements of it. On the other hand all must agree that the inclusion of other important major activity areas greatly strengthens the program.

The general shop idea is a going concern. It is no longer controversial in the sense that it is problematical whether it will survive as a part of the industrial arts curriculum in the public schools. It may be said that we have now arrived at the point where, in both junior and senior high schools having one shop only, the general shop concept is the only acceptable one. It has been generally agreed for many years that the general shop has been the major industrial arts contribution to the junior high school movement because, among other things, it offered new and better opportunities for student exploration, guidance, and more adequate provision for individual differences.

We find, therefore, that the Indiana State Normal School (now Indiana State Teachers College) offered a course known as "The General Shop" for the first time during the school year 1924-25. The nature of the course is described as follows:

> This course is planned to meet the various needs of those preparing to teach in a general shop in which a variety of activities are centered around woodwork as a basic activity, and including such other activities as sheet metal, plumbing, electricity, etc. It includes a study of the theory and organization of the general shop and household mechanics courses with special emphasis upon working out and using the job sheet, also practical work in the construction of projects.

The same title has been carried in all succeeding catalogs; and at the present time the description of the course is as follows:

> Emphasis is placed upon the theory, organization and ways and means of establishing and operating a general shop program.

Indiana State Teachers College, in 1959, is in a better position than ever before to offer students the kind of instruction and educational environment which will fit them to teach in what, for the lack of a better name, we call the General Shop.

The Electricity-Electronics Area "What's Watt"

Berry E. Morton
Professor of Industrial Education, I. S. T. C.

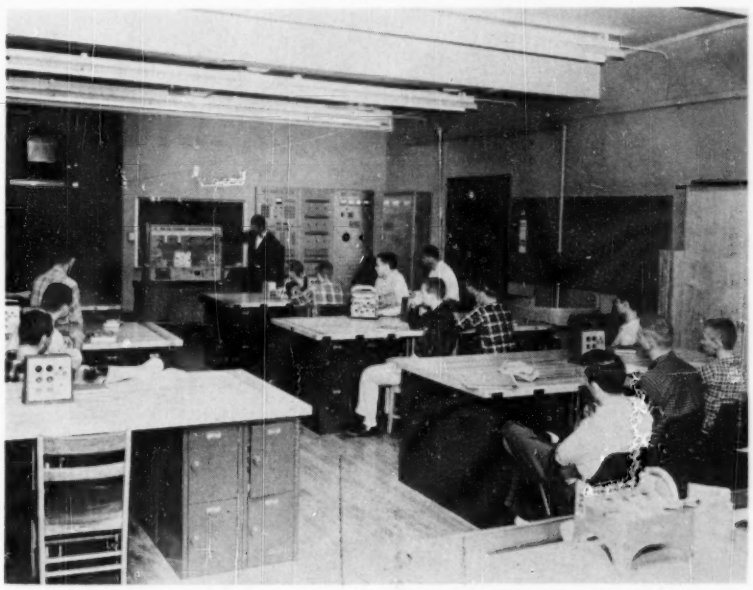
The all new electricity-electronics shop in the department of Industrial Education at Indiana State Teachers College is another example of the determined effort of this department to set the pace in the technical training of the future industrial arts teacher. Although the shop is new, the area of electricity-electronics is not new. Courses in the general area of electricity have been offered since 1940. However, it was not until the completion of the new facilities in the the fall of 1957 that the full range of theoretical and laboratory experiences were possible.

The shop is designed to provide lecture, demonstration and student laboratory activities with one classroom. From the viewpoint of laboratory experiences, the shop is equipped with general and specialized tools and machines to permit fast and accurate completion of experiments, construction of projects and analysis and repair of electrical household appliances.

Thus, the future industrial arts teacher spends a minimum amount of time in the fabricating of wood, metal and other materials, and a maximum amount of time in working with the many and varied aspects of electrical and electronics principles.

In addition to the broad general coverage of fundamental electricity-electronics, the shop is especially equipped to provide comprehensive activities in house wiring, electric motor analysis and repair, electrical and electronic circuit controls and the very popular area of radio and television repair. In addition to the above, plans are now under way to add special facilities to include automotive circuitry. This new area will include the re-winding of generators and starters.

Each student who is working toward the Comprehensive or Special Industrial Arts Teaching Certificate is required to participate in two fundamental courses in Electricity-Electronics. For those students having a special interest in this area, other courses are provided to enable the student to specialize in the general field of industrial arts electricity-electronics. In addition, several graduate courses are offered, thus enabling the teacher in the field who is earning credit beyond his B.S. degree to up-grade himself in this comparatively new and most important addition to the general area of industrial arts.



Electricity and Electronics facilities at I. S. T. C.

Conference Facilities Help Develop Industry-School Relations

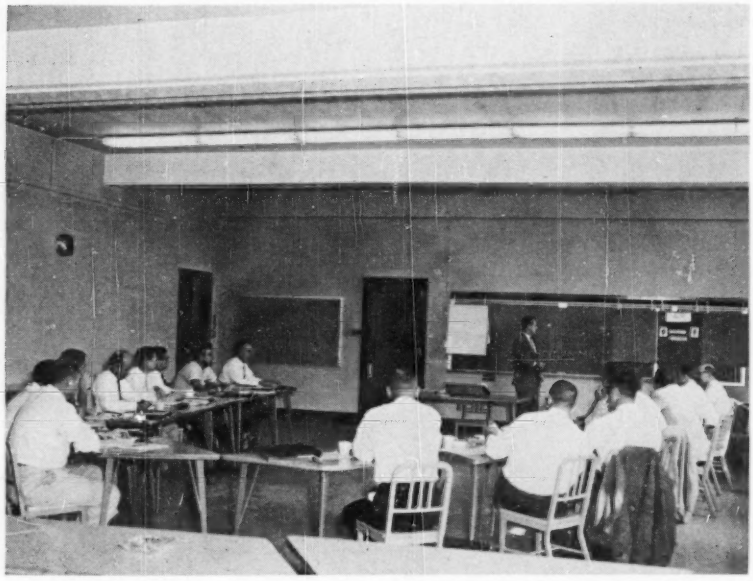
Russel W. Adams
Associate Professor of Trades and Industries, I. S. T. C.

Sending Johnny to school is a heritage accepted in America's far-flung educational system; however, having dad and even grand-dad knocking at the "ivy-tower" has been of concern to educators and industrialists. True, the training of professional people in our educational institutions has been traditionally acceptable; but the demand for training, retraining, and up-grading of what could reach 60% of all our citizens indeed warrants the concern of all who make up this great republic of ours.

Under our constitution and laws, we have the responsibility of training craftsmen, technicians, supervisors,

housewives, farmers, and all others who would benefit from such training; and they are seeking our assistance.

Both educators and industrialists are becoming aware of this demand for new types of training programs and finding that many of the established curriculums are not serving the needs. Furthermore, they find that the facilities are inadequate.



Conference facilities for Industry and School Activities at I. S. T. C.

One of the most encouraging developments has been the acceptance by educators and industrial personnel that they can more effectively develop functional programs using the teamwork approach in which they are both involved in analyzing needs, developing and evaluating the various types of programs.

In most cases it is found that the administrative techniques employed by school people are effective. Of course, the real success of these endeavors is the result of better communications between industrial and school people working together to solve mutual problems. The very nature of the vocational educator's job has compelled him to work closely with industrial people.

The state laws under which vocational programs function in Indiana require that there be advisory committees both at the state and local level. The framework by which apprentice programs are established and administered is a typical example of the teamwork approach. The most successful ones have governing bodies known as "joint apprentice committees" composed of equal representation from management and labor. The committees seek the assistance of vocational educators, representatives of The Bureau of Apprenticeship, and the employment service—and the results have been most satisfying.

As a service organization, educational institutions are endeavoring to provide facilities that more adequately serve the needs of industry. Such is the case at Indiana State Teachers College. In the planning of the Industrial Education Building, conference rooms were built and the decision to include them has certainly proved the soundness of judgement by those responsible for this planning.

During the last three years they have been utilized extensively and have served a variety of needs. During the day they are used for classroom instruction where groups varying from 10-250 may be accomodated. Social gatherings as well as various kinds of meetings are held and the demand is becoming increasingly noted.

The relationships that have developed with industry and business personnel could never be fully evaluated. However, several significant educational programs have resulted because of these facilities. Two years ago an industrial management development program was set up in the Terre Haute area, and this program has utilized the three conference rooms for four evenings each week. The demand is such that additional space is now needed.

The Terre Haute Management Club meets once each month and the facilities serve the needs of their 250 members admirably. The Society of Metals and many other industrial and business groups are being accommodated. Most significant, of course, is the opportunity afforded school people to work with industrial and business personnel; and as a result, more effective training programs have and will evolve because of these relationships that have been established.

During the summers many workshops have been held; and it appears, that there will be an increasing number of conferences using these facilities. Saturdays are not excluded since state meetings of committees are held almost every week.

By recognizing the need for closer industrial-school relations, and by providing the facilities and stimulation to bring this about, Indiana State has demonstrated its willingness to accept this challenge.

The Training of Administrators, Coordinators, and Supervisors in Vocational Trade and Industrial Education

Donald L. Pound

Associate Professor of Trades and Industries, I. S. T. C.

In Trade and Industrial Education there are clear definitions of terms which are "bandied" about by persons who have not a clear perception of their true meaning. The Industrial Education Acts of 1913 and Federal Acts of 1917 are very concise in defining what Vocational Education consists of, how it shall be administered, by whom, and how finance shall be provided. We shall attempt to quote those parts of the above mentioned laws which will clarify some of the most commonly used and often misunderstood terms. A thorough understanding of these terms is essential for all administrators and supervisors of such programs.

The Indiana Vocational Education Acts of 1913 defines Industrial Education as follows:

> "Industrial education" shall mean that form of vocational education which fits for the Trades, crafts and wage-earning pursuits, including the occupation of girls and women carried on in stores, workshops and other establishments.

The Acts further provide that such program shall be under the direction and supervision of approved individuals. The law states it thusly:

> "Approved industrial, agricultural or home economics school or department" shall mean an organization under a separate director or head, of courses, pupils and teachers approved by the state board of education designed to give either industrial, agricultural or home economics education as herein defined.

The inclusion of evening classes is defined by the law as follows:

> "Evening class" in an industrial, agricultural or home economics school or department shall mean a class giving such training as can be taken by persons already employed during the working day, and which, in order to be called vocational, must in its instruction deal with the subject-matter of the day employment, and be so carried on as to relate to the day employment. But evening classes in home economics relating to the home shall be open to all women over sixteen (16) who are employed in any capacity during the day.

This defines different responsibility and emphasis is generally understood.

The fact that the law recognizes the need for part-time classes also means that the Vocational Coordinator must have specific training which enables him to carry out the intent and purpose of this phase of the program. Apprenticeship training is a part of this responsibility.

The Indiana Acts state the following:

> "Part-time classes," in an industrial, agricultural or home economics school or department, shall mean classes for persons over fourteen (14) years of age giving a part of their working time to profitable employment and receiving, in the part-time school or department, instruction complementary to the practical work carried on in such employment, or instruction in subjects given to enlarge civic or vocational intelligence, or instruction in trade preparation subjects. To give a part of their working time, such persons must give a part of each day, week or longer period to such part-time class during the period in which it is in session. (Acts 1913, ch. 24, *1, p. 37; 1919, ch. 132, *1, p. 596).

Application of this section requires much special preparation on the part of the Vocational Administrator.

Another unique factor of the vocational program is that the Acts require each school to operate the program with a lay advisory committee.

> Advisory Committee. — Boards of education or township trustees administering approved vocational schools and departments for industrial, agricultural or domestic science education shall, under a scheme to be approved by the state board of education, appoint an advisory committee composed of members representing local trades, industries and occupations. It shall be the duty of the advisory committee to counsel with and advise the board and other school officials having the management and supervision of such schools or departments. (Acts 1913, ch. 24, *9, p. 37).

Naturally, this requires that coordinators have training in principles and methods of implementing this phase of the program.

The Acts also provide that approved schools be reimbursed according to the approved plan of the State Department of Vocational Education. The vocational administrative training program must include training in carrying out this part of the program.

> 28-4913 (7047). Payments to School Corporation.—The state, in order to aid in the maintenance of approved vocational schools or departments for industrial, agricultural and home economics education, shall, as provided in this act, pay annually after June 30, 1923, to schools and departments an amount not to exceed one-third of the sum expended for instruction in vocational and technical subjects authorized and approved by the state board of education. Such cost of instruction shall consist of the total amount raised by local taxation and expended for salaries and official travel of the teachers of approved vocational and technical subjects. (Acts 1913, ch. 24, *14, p. 37; 1919 ch. 132, *8, p. 596; 1923, ch. 188, *1, p. 551; 1941, ch. 96, *1, p. 237).
>
> 28-2912 (7046). Cities and Towns Reimbursed.—Vocational schools or departments for industrial, agri-

cultural and home economics education shall, so long as they are approved by the state board of education as to reorganization, buildings, location, equipments, courses of study, qualifications of teachers, length of term, methods of instruction, conditions of admission, employment of pupils ad expenditures of money, constitute approved vocational schools or departments. School cities and towns and townships maintaining such approved vocational school shall receive reimbursement as provided in this act. (Acts 1913, ch. 24, *13, p. 37; 1919, ch. 132, *7, p. 596.)

In addition to the provisions of our Indiana Acts, of 1913, in 1917, the Indiana Legislature accepted the provisions of the 1917 National Acts of Congress for Vocational Education and placed the responsibility on Vocational Administrators for carrying out its provision.

28-4917 (7051). Federal aid.—Act of Congress Accepted the provisions of an act of congress entitled "An act to provide for the promotion of vocational education; to provide for cooperation with the states in the promotion of such education in agriculture and the trades and industries; to provide for cooperation with the states in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure," are hereby accepted by the state of Indiana as to:

A. Appropriations for the salaries of teachers, supervisors, or directors of agricultural subjects.

B. Appropriations for salaries for teachers of trade and industrial subjects.

C. Appropriations for the training of teachers of vocational subjects. (Acts 1917, ch. 112, *1, p. 344.)

Title of Act. The title of Acts 1917, ch. 112, reads:
"An act accepting the provisions of the act of congress providing for natural aid for vocational education and providing for carrying the same into effect." In force May 31, 1917.

This additional responsibility for administering the state's original program makes the Training program for vocational administrators still more complicated.

The aforementioned Acts and Policies make the problem of vocational administrator training one which deals with Local, State, and Federal laws and policies and one which puts the vocational director, coordinator and supervisors in a precarious position because of having to interpret all of these directives harmoniously.

All of these provisions made by laws have led to the following general pattern for certification of the vocational administrator.

1. He must have a minimum of 3 years Journeyman trade experience.
2. He must have taught at least 3 years in an approved vocational program.
3. He must have a degree from an approved college with a major in industrial vocational education.
4. For a permanent certificate, he must have completed a masters degree with a major in Industrial Vocational Education.

National studies have been conducted to determine the most appropriate administrator training program. The pattern reported here is the generally accepted pattern throughout the States.

The following course titles suggest the types of training classes best suited to qualify a Vocational administrator.

Organization of Instructional Materials
Organization and Administration of Trade and Iudustrial Education
Vocational Guidance
Preparation of Instructional Materials
Philosophy of Vocational Education
Trade and Occupational Analysis
Methods of Teaching Trade Extension Classes
Industrial Vocational Coordination
Diversified Cooperative Education
Methods of Teaching Vocational Shop and Related Subjects
Vocational Shop Organization
Conference Methods
Tests and Measurements in Industrial Education

The Indiana State Department of Education has approved Purdue University and Indiana State Teachers College for providing the training for Industrial Vocational Education Administrators.

As Industry and Technology change, the emphasis and applications must also change. Every effort is being made to keep the training program for Vocational Administrators up-to-date.

The "Circuit Riders" of Vocational Trade and Industrial Educaton

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The services performed by itinerant teacher trainers of the vocational division remains a mystery to many people. A short and concise answer to the query "What does the teacher trainer do?" would do much to clear the mystery. However, organizing the descriptive outline for an explanation has been almost as difficult as the comprehension of the descriptive discourse! An almost forgotten term from the history of our frontier days looms out of the past to possibly rescue us from the dilemma. At least an interesting parallel can be drawn between the early day gospel "circuit riders" and the present day vocational itinerant teacher trainers.

Religious services performed by "circuit riders" became a typical fea-

ture of our early frontier life. The "circuit rider" had to be a good preacher, accustomed to hardship and outdoor life. He traveled on horseback at the rate of 5000 miles per year preaching two times per day on week days and three times on Sundays. Services were held in private homes, barns, or even in taverns!

The problem of providing teaching from the Bible and worship services for the people on the frontiers was met by a plan which took the preaching and the worship services to the people where they worked and lived. This is essentially the same solution now employed to meet the problem of developing teaching skills and techniques among various trade and technical people in the communities of the State who are willing to devote part time to teaching others their specialized skills and knowledge. The job of the itinerant teacher trainer has become more complicated, however, since he must share his knowledge and experience not only for teaching skills and technique but also for new construction plans, curriculum development, administration, coordination, State Department supervision and other consultant services.

The nature of the contacts and services demands exacting qualifications. Although physical stamina and health are still important for extensive travel more importance is placed upon acquiring a background of trade or occupational experience, masters degree with teaching license, successful vocational teaching experience and finally experience in supervision or administration of vocational programs. Experience qualifications practically eliminate the youth from this service area. The itinerant teacher trainer rides his circuit by automobile traveling some 20,000 to 25,000 miles per year, teaching methods and techniques to occupationally competent part-time teachers, either in class groups or through individual instruction. He consults with local directors, coordinators, superintendents, and principals, meets with advisory committees and groups, assists with community surveys and evaluations and performs supervisory functions as representatives of the State Department, Vocational Division, and usually teaches at least one campus class.

The trade and industrial programs of the State are now serviced by seven full-time itinerant teacher trainers; five are based at Purdue University and serve the State north of highway 40; two are based at Indiana State Teachers College and serve the portion of the state to the south of highway 40.

"So, what do you do Mr. Itinerant Teacher Trainer?" I harness my 180 horsepower and ride the educational circuit devoted to spreading teaching methods, skills and techniques, among the tradesmen; I am a "Circuit Rider."

Supervised Teaching in Industrial Arts Education

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Recent studies reveal that the influence of the teacher upon the welfare of the individual and society is second to that of no other professional group. Supervising teachers and student teachers are confronted with many problems to be solved within a period of a few weeks which could not be solved satisfactorily by others in a life time. Both groups must face the challenge and by a selective and intensive process, secure the maximum of achievement in a minimum of time. They must recognize the opportunities and the obligations which are theirs.

To secure maximum results in student teaching, a proper attitude on the part of both student teacher and supervising teacher is necessary. Nothing will bring about such an attitude more readily than a complete understanding on the part of both with regard to the problems of the teacher. The student teacher must have a clear idea of how he is expected to meet these problems and attempt to solve them with the assistance of the supervising teacher.

The following material has been compiled to serve as a partial guide for both student teacher and supervising teacher in Industrial Arts Education.

Orientation of Student Teacher in Industrial Arts Areas

After the student teacher has received information from the school principal concerning the entire school program and community, he is introduced to his supervising teacher in Industrial Arts. Student teachers are anxious to know which classes they will be teaching and how they can start preparing for these classes. They want to know more about the shop areas and how they can use the available facilities to best advantage. A tour of the shops gives them a better idea of how to begin preparation for their teaching. On this tour they visit the Industrial Arts shops, library, teaching aids center, storage areas, and other parts of the building where they will be working with pupils.

The next phase of the orientation is an observation-participation period of one or two weeks. Gradual induction into student teaching is much more effective than starting at once without proper planning. During this period the supervising teacher and the student teacher form a team and work toward improving the learning

experiences of the pupils. Some activities in which the student teachers participate include the following:

1. Work with students on projects —give individual assistance
2. Assist with demonstrations and classroom activities
   a. Grading papers
   b. Grading drawings and projects
   c. Participate in discussions
3. Aid in repair and care of tools and machines
4. Become familiar with tools, machines, teaching aids, and reference library—especially in area to be taught
5. Take roll, make out attendance report, read bulletins
6. Care for rooms—lights, windows, and bulletin boards
7. Attend faculty meetings and P.T.A. meetings

Planning Classes To be Taught

Careful planning provides for more effective learning on the part of the pupils, gives the student teacher a sense of security in teaching and aids him in preventing the problems of control.

Only a part of the regular term's work is presented by the student teacher, so that part must be planned in detail. Therefore, unit plans are constructed in which certain segments of the term plan are expanded for actual teaching purposes. Even though much of the work in industrial arts is shop work and much of the instruction is individual, the student teacher needs to make detailed lesson plan outlines to expand on the unit plan. This is especially true when related technical information is presented.

Lesson plans are submitted to the supervising teacher at least two days prior to the use of the plan in the classroom or shop to allow time for the suggested revisions, if any. The first plans should be quite detailed, with close attention to outlining teaching procedures. As the term progresses, the student teacher will be able to reduce the amount of detail in his plans and should end his supervised teaching with his plans in the form which they will take when he is teaching five or six classes a day.

The long range or term plan includes:

1. General framework of the course
2. Approximate time to be spent in each area
3. Sequence of units
4. Specific objectives of the course

Planning a unit of work includes:

1. Selection of objectives that can justifiably be achieved
2. Detailed expansion of a segment of the term plan
3. Logical teaching organization of course work and shop work
4. Survey and selection of teaching materials for the class
   a. Textbooks and reference books
   b. Audio-visual aids
   c. Demonstrations
5. Selection of activities through which the objectives may be achieved
6. Appropriate means of evaluating the stated objectives
7. Evaluation of the unit by the student teacher and supervising teacher

Lesson plans should provide a guide for the direction of learning activities which will enable the student teacher to accomplish the following:

1. Know exactly what he wants to accomplish
2. Apportion time purposefully
3. Handle routines efficiently
4. Use resources effectively
5. Insure orderly progress of activities
6. Secure maximum pupil participation
7. Explain assignment carefully
8. Evaluate teaching-learning processes

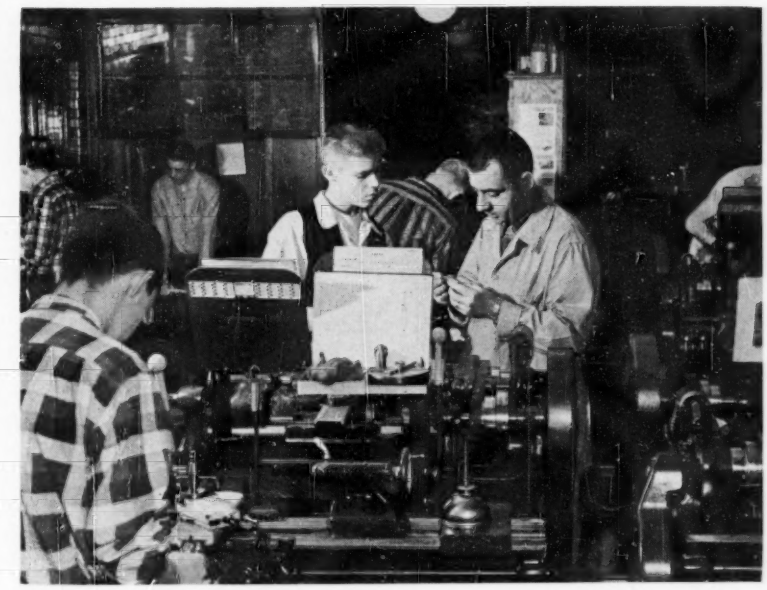
Conferences

Conferences between student teacher and supervising teacher provide an opportunity for guiding, counseling, and evaluating the student teaching program. All phases of the student teacher's activities are discussed with emphasis on cooperative planning, sharing, evaluation of the objectives, and procedures for various plans. At least one conference period each week is scheduled with the student teacher and informal or unscheduled conferences are held at the end of the day or immediately after a class or after a demonstration or activity in the shop. The informal conference is most beneficial when it immediately follows an activity, is carried on informally and is initiated by the student teacher immediately after an activity.

The student is encouraged to keep a record of decisions reached and subjects discussed at conferences in his "cooperative note book." Many times he will want the supervising teacher to record comments or answers to specific questions in this notebook. A daily record of activities is kept in this notebook by the student teacher and many students leave space for daily remarks from the supervising teacher.

Some of the subjects which the supervising teacher and the student teacher discuss at conferences are as follows:

1. The student teacher himself
2. The students in the class
   a. Individual and group differences
   b. Interest, needs and abilities
   c. Available data on students
   d. Learning difficulties
   e. Methods of handling behavior problems
   f. Evaluation
3. Planning teaching
4. School routine
5. Evaluation of student teacher progress



Supervised teaching in Industrial Arts at I. S. T. C.

6. Shop personnel organization and shop procedures
7. Safety practices

Evaluation

The evaluation of the work of the student teacher is continuous throughout the student teaching period. The supervising teacher evaluates all phases of the student's work, and at the same time helps the student develop skill in self evaluation. He should help the student teacher evaluate and arrive at some conclusions as to values of various methods, techniques, instructional aids and types of shop organization and management.

Student teaching is evaluated by a check list and by descriptive statements rather than by grades or marks. This, too, is a cooperative process whereby the supervising teacher and student teacher discuss the various items as they are checked or filled out by the supervising teacher.

Conclusion

Supervised teaching, to be successful, must be a cooperative enterprise between student teacher and supervising teacher. The student teacher experiences much more success if he is properly welcomed and accepted by the staff and the students with whom he will be working. Becoming acquainted with students is a gradual process and usually occurs during the first two weeks when the student teacher assists them individually in their various shop or class activities in an informal atmosphere.

Lasting impressions of what constitutes superior or inferior teaching are formed during the course in student teaching. The teacher who is successful in the development of excellent teaching skills as a student teacher has an influence of many dimensions on the future of our country.

Industrial Arts and the Education of Technicians

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In recent years a need has arisen in our economy for the education of technicians. This occupational classification is described as requiring some of the capabilities of the craftsman as well as a good foundation in the basic theory of the professional person. Thus his economic value is not limited to the overt performance of the craftsman nor does it require the educational accomplishments of the professional person. In that sense the technician lies somewhere in between the two.

The question has been raised as to what contribution industrial arts education can make toward the increased demand for technicians in industry. Some of the answers to this query have proposed changes in industrial arts education to develop specialized skill and technical knowledge. When conscious intent to meet special occupational demand is expressed either in words or in practice, the basic philosophy of industrial arts education is subverted. This statement is not meant to exclude as non-educational certain measures of special attention to and encouragement of those individuals who indicate aptitude and interest in technical occupations. But the basic philosophy of the curriculum area must always be focused upon the general needs of all youth.

However, industrial arts education can make its contribution to meet the needs of special occupations by doing better in practice what it purports in its theory. Thus this thesis is proposed: In a highly developed industrial culture the foundational characteristics of an embryo technician are also desirable characteristics of all citizens. The following paragraphs are offered in partial support of this thesis.

For intelligent use and full enjoyment of the products of industry, modern living requires something of the technician's spirit (see following parapraghs) as well as something of his knowledge and skill. To develop this in youngsters is already a part of the mission of industrial arts education, but teaching practice must accentuate this more widely and more adequately.

A technician must be curious about machines and technical devices. He should have urges to investigate and understand how things work. Industrial arts education purports to encourage these characteristics, but in its practice it must make doubly sure that it does nothing to thwart the normal expression and satisfaction of curiosity and adventuresome investigation whenever it evidences itself in the actions of its young charges. (It is assumed that limiting factors, such as safety, exist).

A technician should be critical of design and function in technical devices and machines as well as of procedure in technical processes. Industrial arts education does not deny the responsibility for encouraging a constructively critical attitude, but in practice it is far from reaching the goal.

The technician must be creative. He will not always have spelled-out job sheets to trigger off habitually skilled actions. Initiative, resourcefulness, and unorthodox thinking in problem situations are necessary to distinguish him as a technician. Industrial arts education would not reject these characteristics as desirable for general living and for any occupation. In its practice it must refrain from teacher-domination and imposed patterns of action that remove opportunity for struggle with problems and that thwart creative tendencies.

A technician needs to understand and experience the applications of mathematical and scientific principles in practical situations. In its theoretical description industrial arts education does not neglect this emphasis. In its practice it must consciously and purposefully include these applications.

To respond satisfactorily to the demands of industry for technicians, industrial arts education needs to re-appraise continuously its basic mission light of the best we know about child development and the needs of modern living; but equally important, industrial arts education must practice more effectively what it purports in its theory.

Graphic Arts: Servant for the Nation

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Have you ever stopped to think what printing means to you? From the morning paper at the breakfast table, to the magazine or journal at bedtime; we utilize the printed word many times and in many ways during the course of a day. In fact it is such a constant companion that it is hardly noticeable but it is always there waiting to serve in its many and varied uses.

How many ways are there to print? Which way is best? These questions may confront us at one time or another. This Journal is an example. How was it printed?

When we wish to have printing done, a method must be selected. Actually there are only four methods of printing. The printing surface may be raised, as in letterpress called relief; even, as in lithography called planographic; below, as in gravure called intaglio; through, as in silk screen called mitography or serigraph.

All of these methods are called the graphic arts or printing arts. Also included in graphic arts are: photography, gold stamping, bookbinding, rubber stamp, linoleum block, thermography, and others. The graphic arts laboratory at Indiana State has all these areas.

Why so many methods?

Each printing method has its merits. Letterpress is the oldest method and is the most widely used. Offset lithography is second, and is gaining in popularity with the advent of better inks, paper, presensitized plates and faster presses. Gravure is third and is excellent for very long runs at high speeds. Silk screen is fourth and has proven itself in special areas.

A description of each method is necessary for one to understand and realize its own unique characteristics.

Letterpress starts from hand or machine set type. The machine may be Linotype, Intertype or Monotype. Once the type has been set and corrected it is made into forms, locked in a chase and placed on a press. The form is inked and paper is placed directly on the type form; squeezed hard enough to transfer the ink to the paper. The form can be used until it wears out. A paper matrix may be made from the original type and molten type metal flowed into it. This may be used as the type form and when it wears out the matrix may be used to make another form. This is called a stereotype. Newspapers use this method made from cylinder shaped stereotypes for their rotary presses.

Offset lithography may start from a letterpress type form, but not necessarily. It may come from cold composition such as a Varityper or a Fotosetter; machines that set lines of type on photographic film. Once

the form has been photographed it is stripped to a masking sheet and placed in direct contact with a light sensitive coated aluminum, zinc, or plastic plate. The plate and negative are placed in a vacuum frame and exposed to highly actinic light; the plate is then developed, the unexposed coating removed, and rolled up with lacquer so the image is visible. The plate is placed on the press. It might be mentioned at this point that lithography is based on the principle that grease and water resist one another. On our plate we have an image area and bare metal. When the plate is dampened, the water or etch, as it is called, will not adhere to the image part of the plate because it is of a greasy substance, but the bare metal is not, so the water will adhere to it. The ink will readily adhere to the greasy part or image area of the plate but will not mix with the dampened bare metal or non-image area. Therefore, an offset press must have water rollers in addition to the ink rollers. From where does the term offset come? Remember, in letterpress we printed directly from the inked type form. In offset the plate never touches the paper. The plate is dampened and inked, it is then squeezed between the blanket to transfer its image. The paper is squeezed between the blanket and another cylinder to give the finished print. Hence, the term offset. What benefits do we obtain by this process? First, the plate lasts much longer; second, it allows us to print on almost any kind of paper stock; and third, it permits high speed reproduction. Offset is very good for long runs, pictures, and graphs. Tabular forms may be all run together without special makeready. One may enjoy short runs by offset via the paper plate method. The material is typed directly on the paper plate, it is then placed on the press and printed. From 25 to 2,500 copies may be made depending on the care with which the plate was made and how well the press is adjusted.

Some printing is done by lithography, but on a smaller scale. Lithography defined: Litho means stone, or to write with stone. Some plants in the United States use the direct lithographic method, but use metal plates instead of stone. Lithographic printing is done directly from plate to paper. Some of the finest work from stone was done by Currier and Ives.

Offset has been maligned a great deal because of some very poor quality work produced by this method. When properly printed, an expert would have difficulty telling the offset from any other printing method without closely examing the copies.

Gravure is also printed from a metal plate. The copy may come from either cold or hot metal composition. Negatives are made and exposed on the sensitized plate. Gravure is just the reverse of letterpress, that is, the printing part of the plate is below the surface. The paper comes in direct contact with the plate, the ink is transferred to the paper by capillary action. As in letterpress the run is determined by the quality of the metal used in the plate. The plate is inked from a fountain and the plate is scraped with a blade, called the doctor blade, leaving only the ink below the surface. One can readily conclude that one type of ink can't be used for all processes. Gravure ink must be thin to be absorbed by the paper and also volatile so it will dry fast and not smear, whereas in lithography the ink must be very greasy in order to resist water. When the gravure plate is in a cylinder form it is called rotogravure. Our own brown section of the Terre Haute Sunday Edition is printed by this method.

What are the values of gravure? First, it is very fast; second, when the plates are chrome plated, millions of copies are possible; and third, one can print both sides in several colors immediately. Gravure is best for long press runs or where millions of copies are needed.

Silk screen is a stencil method of printing. It is a very old method, and has really become very popular in the last few years. The copy may come from a photograph or a drawing. The stencil may be of a lacquer, water soluble, carbon, or photographic medium. The lacquer film is very widely used and enjoys great popularity in the school shop. The process explained: A suitable design is selected and a stencil is made with one of the mediums. A frame is made and silk or organdy is stretched across the frame. The fineness or coarseness of the silk is a determining factor depending on the type of design used; the finer the copy, or lines, the finer the silk must be. After the silk has been stretched the stencil is adhered to the screen. Paint or ink is placed in the frame and the paint is drawn across the frame with a squeegee, a tool made of metal or wood with a rubber blade. The squeegee forces the ink or paint through the open parts of the screen transferring the design to the paper under the screen. From 10-10,000 copies may be made from a design depending on the materials used.

What are the advantages of silk screen? It is a very simple method of printing and success may be obtained with a minimum of effort. Silk screen may be adapted to print on almost any kind of surface, any shape, or size from a glass ash tray to a 55 gallon drum may be printed by this method. Colors may be laid on in solid coats and several coats may be overlapped and the top color will still retain its full brilliancy. When these paints are treated they are very permanent. Some example of silk screen may be seen on: ash trays, Coca-cola, 7-Up and "76" soft drink bottles; T shirts, notebooks, and decals. In the past few years new silk screen inks have been developed enabling us to print on almost all the synthetic surfaces such as, plexiglass, lucite, polyethylene, vinyl and many others. New materials such as nylon, dacron, and stainless

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Adult Education as an Integral Part of Public Education

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There is great variation of purposes, practices, and acceptance of adult education programs. Fees range from none, through flat rate token varieties, to fees covering complete cost of instruction plus a little profit. This is evidence that different communities hold different values for adult education. Concern with operation of an adult education program prompted a clarification of values and a criticism of practice. In order for adult education to become an integral part of the system of education for a democrary the assumption is made that it be free and available to all citizens of the communities. This includes all forms of education, undergraduate, postgraduate, higher education, and special education, which provide opportunities for individual improvement and improvement for society.

If education is interpreted in the broader meaning, such that all experience is considered educative, then there is no actual termination of education. From this standpoint some may say that we do have free educational opportunities for all adults who want it. For purposes of this discussion, education will be considered as those forms of organized educational activities which are carried on in the communities through the public schools. In order to be an integral part of the system of education for a democrary, it is assumed that adult education should be publicly supported through taxation in the same way as our elementary and secondary schools are supported.

The consideration of education as a social function calls to attention the question of the point where education be terminated, if at all. Why has our society set the time blocks for "free" and "universal" education at graduation from elementary and graduation from secondary schools? Should all citizens of a democrary be able to continue their education indefinitely regardless of age? Does the popular twelve year period of "universal" and "free" education perpetuate and improve the present society as effectively as it did for the society of a century ago for which it was organized.

Serious thought must be given to the questions above as we analyze and clarify current problems of our society. Public interest is becoming more intense in the search for solutions to collective problems. This interest is expressed through political issues and government action. The rapid change in industry and the high speed production techniques place a premium upon young workers while the older workers are discarded with many years of life expectancy remaining. These same forces are operating the scale of life, to prolong the period of youth by restricting opportunities to enter occupations. Adding yet to these perplexities we have the increased life expectancy resulting from an effective public health program and a decreasing birth rate both of which are operating to increase the proportion of adults in the total population. Associated with these problems of social and economic nature is the problem of an increasingly more complicated self-governing which requires a more intelligent citizenry. Linton[1] points out that "language and organized social life have given man instruments for transmission and passive preservation of cultures of any conceivable complexity." Such a statement, by itself, is very encouraging but it becomes somewhat perplexing when one adds that we have approximately ten million adults in our population with less than fourth grade reading and writing ability. One must again reweigh his educational values and beliefs when consideration is given to the rapidity of change taking place in cultures of our society. Linton[2] points out that cultures are changing too rapidly to be transmitted by the gradual molding process which has operated from one generation to the next. This condition is made evident by the problems created between young people and their elders. Youth are frequently at odds with their elders and are often critical of the old standards without having developed new standards for replacements. Youngsters are giving up their emotional allegiance to the culture of their parents.

Some major points of issue are made evident through examination of the foregoing problems. The compartmental organization for education assumes an end for education external to life and growth. The complexities of modern society are beginning to clarify the need for adult change and growth through education. Adult life cannot be partitioned off as that part of life which makes use of the learnings of the earlier part of life. Life, growth, and change must be accepted as continuous processes opposing the concept that education is preparation for life. "Education means the enterprise of supplying the conditions which insure growth, or adequacy of life, irrespective of age."[3] A further point is brought out that adults who are not participating in educational activities are not easily changed while youth who are participating are easily changed. Adults, therefore, resist change while youth accept, thus creating difficulties between youth and their elders. The

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[1] Linton, Ralph, **The Study of Man,** p. 85

[2] **Ibid.,** p. 284

[3] Dewey, John, **Democracy and Education,** p. 61.

belief that democracy and society as a whole will be improved is basic to belief in adult education as an integral part of an education program. The American tradition of opportunity for self-improvement remains as an active force. Our citizens seek means for increasing earning power, for developing skills which improve standards of living, and for developing hobbies and avocational interests.

Inquiry into the benefits and effects of adult education as an integral part of educational programs for a democratic society is easily avoided by reference to past practices. Law and tradition dictate that society support education for youth usually until the sixteenth birthday. Beyond that age education becomes a private or individual matter and should be paid for by the individual who benefits. To accept this position, however, one must also accept the belief that only the individual can benefit and society as a whole either does not benefit or it reaches a point of diminishing returns. To believe in free adult education is to believe that further enlightenment of all citizens is important to our democratic society. This belief also implies that present publicly supported educational opportunities are inadequate for this modern, rapidly changing culture. We have accepted the concept that some education is necessary for the very existence of a democratic society but we have not examined effects of continuous education upon continuous improvement of society. Associated with the apparent need for free adult education is the assumption that adults want free educational opportunities, that the schools belong to the people and should, therefore, serve the needs of the people. This assumption is supported by a report of the American Institute of Public Opinion[4] in which approximately half of the adults in the country were interested in further education for themselves.

The belief that adult education should become an integral part of publicly supported education implies that future growth and change could be stepped up through a continuous process of interaction. The greater the numbers involved in the educational process the greater will be the interaction which creates changes in people. It holds promise for discounting the concept of training for life and can, in turn, decrease the pressure which crowds information, skill, and knowledge for a complete lifetime into the elementary and secondary schools. Further implications are seen in placing of importance on readiness for learning by removing the need for crowding. Learnings which are considered difficult become more easily learned as needs become more evident and purposes become individualized. Changes in adults hold great possibilities for decreasing the differences between youth and their elders. Cultural lag can be decreased and society can find the pace set by changing technology. As a broad social implication, free adult education operates to equalize opportunity for all and, therefore, tends to remove social and cultural barriers between classes of society. The increasing complexities of society will demand continuous education for its very existence.

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[4] Bergeuin, Paul, et all., "Gallup Survey Indicates Supply is Short of Demand," **Community Teamwork** 3:1, November, 1950.

A Long Way from Home

Harold J. Snidow

Associate Professor of Industrial Education, I. S. T. C.

A walk through our Industrial Education Building and observation of the new and modern equipment, the excellent lighting, the polished floors, even the convenient drinking fountains brings to mind the thought that Americans are indeed fortunate. In America there is to be seen a truly adundant life with opportunities which would appear fantastic in much of the world. What a revelation it would be to our people, our young people especially, if each one were obliged to spend a year in some foreign land which typifies the dismal and almost hopeless plight of half the world's population.

Personal experience with a group such as the Technical Education Team sent by Bradley University to Baghdad, Iraq, gives a person a new perspective when he returns home. Bradley was represented in Iraq during the years 1952-57 contributing to the International Cooperation Administration Program there (the program is perhaps better known as Point Four). An over-simplified description of the responsibility of the Bradley Team would be to say that they were consultants to the Ministry of Education on matters pertaining to technical education and responsible for the establishment of a Technical Institute in Baghdad.

Americans have a great and abiding faith in the values of education. Such faith is also evident in Iraq. The people feel that good schools are implements of their salvation.

This little country, most of which lies in the Tigris-Euphrates Valley is steeped in history dating back six thousand years. Ruins of the most remote antiquity are to be seen everywhere. There has been a city on the present site of Baghdad for four thousand years and here can be seen both the ancient and the modern side by side.

Modern banking houses of striking architecture are only a "stones throw" from market places such as must have existed in the times of Christ. The people themselves reflect this same contrast of ancient and modern.

Until the discovery and development of the vast oil resources in recent years, Iraq (known in ancient times as Mesopotamia) seems to have been by-passed by modern culture. Before 1930 Iraq is said to have had no modern factories, but by 1950, in addition to the great oil enterprises, there were more than 1700 other industrial establishments with a working capital of about $15,000,000 and a labor force of nearly 30,000 persons. The principal industries and their number were: woolen spinning and weaving, 3; cotton mills, 1; distilleries, 5; match factories, 4; cigarette factories, 20; knitting mills, 4; soap factories, 22; brick factories, 25; vegatable oil extracting mills, 4; tanneries, 43; shoe factories, 22; tile factories, 20; breweries, 1; cement factories, 1; modern flour mills, 6; and small flour mills, approximately 1,000.

So we find this small nation of about 6,000,000 people trying, in a relatively short period of time, to progress from the primitive to the modern. In keeping with the general backwardness of the economy, approximately 90% of the people were illiterate.

The foregoing is a sketchy and by no means inclusive background for the operations of the Bradley University Team in their initial appearance on the scene in 1952.

As a result of a concentrated joint effort by Americans and Iraqis, a suitable program of study was developed for the Technical Institute whose new campus was well under way in 1956, but not yet available. The first classes were enrolled in temporary quarters in the Commerical College. Registration for classes took place in early October 1956 with several hundred boys, all secondary school graduates, appearing for entrance. Due to lack of facilities, all but 150 were eliminated by a screening process. The length of the school year in the institute was to be 32 weeks with classes meeting six days per week. Incidently, the Sabbath Day or Holy Day in Moslem countries is Friday which made it necessary for the Americans to work on Sunday, a requirement with which some were not in full accord.

The program of studies was divided into three curricula. Automotive and Mechanical, Building Construction and Electrical. The school day was divided, according to Iraqi terminology, into two parts: the morning for the theoretical and the afternoon for the practical. For example, in the Automotive and Mechanical section the theoretical studies included for the first year, English, Technical Drawing, Mathematics, Theoretical Physics, Industrial Chemistry, and Surveying. The "Practical" required them to spend the afternoon in the various shops related to the Automotive and Mechanical curriculum. The school was to provide three years of instruction with the purpose of supplying those technicians which are needed to fill a recognized gap between the journeyman craftsman and the professional engineer.

In addition to Mr. Chelsea Bailey, the Chief of the Team, six assistant directors were present: Mr. Ray DeForest from the University of Cincinnati, Automotive Specialist; Mr. Clifford Fox, Electrical Specilist; Dr. Wayne Ramp, Southern Illinois University, metal trades; Mr. Sam Russell, Florida A & M, Printing Specialist; Mr. Waino Thompson, Bradley University, Building Trades; and Mr. Harold Snidow, Indiana State Teachers College, Technical Drawing.

Space does not permit complete descriptions of all the services rendered by the Bradley Team, but perhaps the following abbreviated outline will shed some light on the nature of those services:

1. Expansion of the Physical Facilities
2. Selection and purchase of Books, Equipment and Supplies
3. Preparation of Instructional Materials
4. Selection of Iraqui Teachers For Training in the United States
5. Provision for In-Service Teacher Education
6. Improvement of Methods and Curricula
7. Development of Research Projects
8. Surveys of Educational Needs
9. To serve as Consultant in Technical Education at all School Levels
10. Aid Conferences, Seminars, Conferences

Only those who have actually participated in a venture such as this can understand the obstacles and difficulties encountered, but without boasting, it surely can be said that the Team did a highly creditable job with some of the projects listed above and enjoyed a degree of success with all.

Although the prescribed duties of the American Technical Education Team was limited to higher education at the Technical Institute level, we found ourselves being called upon to offer assistance in the trade and technical schools of less than college grade.

There was in Iraq in 1957 a great need for education of all kinds since about ninety per cent of the people were illiterate. The Government's ultimate goal was to provide at least a primary school education for all, but that goal was some distance in the future as late as two years ago. Since then the country has been in a state of revolution so it is unlikely that much has been done to improve the lot of the common man in the meantime.

Those who are fortunate enough to finish the six years of primary

school find themselves at an education crossroads. Since any form of vocation involving manual labor is considered degrading, all would prefer to enter the secondary school which is the gateway to higher education in the College of Law, the Medical College, the Commercial College, the Higher Teachers College and the Technical Institute. The curriculum in the secondary school is for five years and similar to the college preparatory curriculum in the United States.

If a boy chooses the technical school or is guided into it, he can continue there for either three years or five years. If he completes the first three years, he may graduate with a trade school diploma, and if he finishes the full five years of instruction, he becomes a technical school graduate. The technical school program is terminal in nature and a graduate from it is not acceptable in any of the colleges or the Technical Institute.

Iraq, in 1957, had only four technical schools, offering a five-year curriculum and eight trade schools offering the first three years only. Some of these schools, with a great deal of American help, were surprisingly well equipped to offer good instruction in building trades, metal trades, automotive trades, printing trades, electrical trades, and vocational drafting.

Suitable physical facilities do not necessarily make a good school. The Bradley University Team would probably agree unanimously that Iraq's need for help with curriculum, teacher education, and school administration over-shadows all other educational needs.

A Community Approach to Management Development

Russell W. Adams

Associate Professor of Trades and Industry, I. S. T. C.

William J. Walters

Supervisor, Planning and Timestudy, Allis-Chalmers Manufacturing Co.

Those were the "Good Old Days"; the supervisor chewed tobacco, wore a vest, could "cuss" the loudest, whip any man in his department and "knew-it-all" when it came to his own line of work. In short, he was the "Bull-of-the Woods." Yes, those were the "Good Old Day," which are now only a part of our American industrial history.

Modern industrial management knows that every supervisor is an important part of the management team and must not only possess skills and knowledge required in his own occupation, but also must have broad understanding of the entire industrial picture. He must know how to manage and how to make the most efficient use of the four major industrial resources: money, materials, machines and manpower. This requires a high degree of leadership and training.

This change in the concept of what is required of the modern supervisor has placed additional responsibilities on industrial executives and supervisors alike.

The company must assume the responsibility for the careful selection of supervisors, since they will be the key executives of tomorrow. The company accepts, in most cases, the initial responsibility for training and developing these men; and it is becoming more and more obvious that those accepting such management responsibilities, must possess personal desires for self-improvement.

There is a common formula, not a magic one, but one that means hard work, that has been accepted by both companies and supervisors.

This formula is:

E.E. + S.P. + C.S. X D.D. (B) = S

1. (E.E.) — Educational Experience

This term joins the two most important phases of man's quest for knowledge—education and experience —each is important; however, they must be related one to the other if either is to be utilized to its fullest extent.

2. (S.P.) — Sales Personality

The day of the "boss and worker" is over; today the supervisor is in the age of the "cooperative teamwork" approach. In order to obtain teamwork the supervisor must sell teamwork. He must sell himself to the worker—there must be a respect that is earned rather than demanded.

3. (C.S.) — Common Sense

This part of the formula has been phrased in many ways; level headedness, ability to function under stress, psychologically stable, quickwitted, etc. However, the most logical description is common sense or good, sound normal intelligence.

4. (D.D.) — Directional Drive

No man can go far in any endeavor without knowing where he wants to go and is willing to put forth the effort to get there. A good supervisor sets his goal high and works long and hard to obtain it.

5. (B) — Breaks

In supervision, just as in any other phase of life, there is that unkown element—change. The supervisor who learns to recognize these breaks, utilize the good ones and make the best of the bad ones will never fear

or depend on them but will accept them as they happen.

6. (S) — Success

This is the result that man expects in every formula, and he will find the result if the formula is used correctly.

The application of this formula depends more and more upon management's recognition that education and training is of great importance.

Most supervisors are not satisfactorily educated when they start, and in our modern, everchanging industrial world the need for education grows in importance every day. Education and training is a constant requirement to industry. This means additional technical and vocational training.

The average individual fails to recognize the breadth and depth of technical and vocational education. Because of this, insufficient recognition has been given to the potential that is afforded people under such training. Vocational training is associated with the skilled trades, which of course, is a very important part; but basically, it is that type which affords people an opportunity to prepare for, enter into, and indefinitely continue to improve themselves in chosen occupations.

Throughout the country there have been apprentice, part-time cooperative, technical, practical nursing, technical extension, trade extension, and public service types of training afforded people through vocational education. Not until recently, however, has it been called upon to fill one of the most serious voids in training opportunities for our citizens—that of management and foreman development.

Many organizations such as the National Association of Manufacturers, National Management Association, and the American Society of Training Directors have also promoted types of training for management personnel, and all have contributed toward satisfying the demands.

One of the most serious limitations to these types of programs has been the few people actually involved; and too frequently, only middle and top management personnel were afforded the opportunity to gain these experiences.

In practically all of these programs organized for middle and top management, it is recommended the men taking the training return to their respective organizations and establish training programs within their own plants for foremen and supervisors. However, these individuals, for the most part, find it impossible to implement programs at plant levels because other responsibilities preclude them from following through.

A second factor is the limited number of plants whose size will support an adequate in-plant training program particularly for management personnel.

In bulletin No. 19, dated September, 1954, by Indiana Employment Security Act, a breakdown of the number and size of industrial establishments in Indiana is listed as follows:

Covered Establishments by Size Class

	Total	0-7	8-19	20-49	50-99	100-499	500-999	1000 of more
TOTAL	19,703	5,263	7,504	4,096	1,456	1,154	133	97

Based on the above figures it is evident that less than 1% of the industrial plants in Indiana are of sufficient size to make a program economically practical. The needs of the other 99% must be fulfilled in another manner. Many universities and colleges have provided various types of programs—particularly for industrial personnel—but the majority of these have been intensive, short term courses dealing in basic management theory. The requirements, in todays industry for management and foreman training is changing so rapidly that there has not been time to develop text books nor train personnel to present a practical up-to-date management and foreman training program. This is where vocational education has been able to establish foremen and management programs on a community-wide basis and to gear them to suit the needs of all industry by involvement in cooperative-continuing programs. An outstanding example of such a program was established and is functioning through the joint efforts and cooperation of educational institutions and industry in the Terre Haute area.

During the summer of 1957, interest was expressed by local industry that resulted in the superintendent asking his vocational director and industrial teacher trainer from Indiana State Teachers College to survey local plants in order to identify the extent of their training needs. As a result of a personal interview type of survey, the greatest need was found to exist in the area of foreman and supervisory training.

The superintendent of the city schools invited *all* plant managers to a noon luncheon in September 1957 at which time a plan was presented to them by the teacher trainer. The plan stipulated that a management development program should be limited to industrial management personnel, that it be set up on a continuous basis, and that it be co-sponsored by local industry, the Terre Haute City Schools, the State Department of Vocational Education and Indiana State Teachers College.

A governing committee consisting of 14 plant managers, the superintendent and vocational director of the city schools and the industrial teacher trainer from Indiana State Teachers College was elected. Their function was to serve as the policy-making body for the program.

One of the first steps taken by this board was the appointment of a course development committee con-

sisting of five industrial and two educational men who prepared the courses for the program that was to start in February, 1958.

It was decided that the first series of courses should be tailor-made to serve the needs of first line foremen; and even though middle and top management would not be excluded from the program, the announcements to be sent out would clarify this point.

The following courses were developed which should consist of ten 2-hour sessions meeting for ten consecutive weeks: Elements of Foremanship, Course Studies in Human Relations, Work Simplification, and Management-Employee Relations. Since then these have been expanded to include Manpower Utilization, Industrial Economics, Report Writing, Industrial Safety, Conference Leadership, Communications, Speech Craft, Getting Along With People and Statistical Quality Control.

Concurrent with this the plant managers selected 15 middle and top management men who accepted the responsibility for serving as instructors and further agreed to enroll in a 15 week vocational teacher training course which included "technique of conference leadership" since this would be the method used to present the courses.

Under the instruction of the teacher trainer these men developed conference leader outlines based upon the content determined by the course development committee, and during the training sessions, were afforded an opportunity to practice their respective sessions which they would subsequently teach.

Announcements of the sessions were sent to the plant managers during December, 1957, with descriptions of the courses, names of the instructors, and conference leaders, and other pertinent information such as time, place, cost of each course. Each plant manager then pre-enrolled his supervisors whom he desired to take the courses.

For the first series of courses, only 108 of the 300 applicants could be accommodated. It is significant that we are now in our third year and are conducting 24 courses per year with enrollment of well over 350; we are still unable to fulfill all of the demands for this training.

To date over 60 conference leaders have been trained, and over 750 industrial supervisors have availed themselves of training in the program.

Looking to the future, consideration is being given to establishing an executive development program and series of sessions for plant managers and members of the industrial boards of directors. Still another program which will be limited to women supervisors is being considered with women from middle management being trained to ultimately serve as conference leaders.

Because of the success experienced in this community program which to date has attracted personnel from over 30 different industrial plants, demands have been made from those involved in transportation including trucking and railroads to establish similar programs. Requests also have been made from utility groups including telephone, electric, gas and water companies.

It has not been a crash program. On the contrary, efforts have been made to build it carefully, with its roots in the soil of the local community and with an eye to the future. The future of the program is limited only by the zeal and effort of those interested in carrying it on. And there are many indications that this enthusiasm is growing steadily.

Graphic Arts: Servant for the Nation

(Continued from page 92)

steel are being used by many printing plants as they are toughter and will give longer runs than silk. This process is very popular in the school shop as it does not require a great outlay of equipment. Silk screen would serve as a hobby for one interested in its possibilities.

Other methods of printing will be briefly discussed. They are: linoleum block, thermography, rubber stamp, mimeograph, ditto, hexagraph, and gold stamp.

Linoleum blocks are very good for patterns whose details are not too fine, although a person with a steady hand and great patience can cut very good details on one. Linoleum blocks are good for short runs, they can be made to print in several colors, and are used a great deal for Christmas cards, etc.

Thermography means writing by heat. The print may be obtained from silk screen, letterpress, linoleum block etc. While the ink is still wet it is sprinkled with thermographic powder, the excess is shaken off and the print is placed under heat. The powder held in place by the wet ink expands and combines with the ink giving it a raised effect. Thermography should not be confused with genuine engraving. An engraving will always have a depression on the back side of the printing. A thermograph will not.

Rubber stamps are made by setting the desired material in type. It is placed in contact with a plastic material of a thermosetting nature. The type and plastic material are put in a press, pressure and heat are applied for a given amount of time. After setting, this plastic is called a matrix. The matrix is placed in contact with unvulcanized rubber and again placed in the press and kept until it becomes vulcanized. It is stripped from the matrix, trimmed,

and mounted on its final base. The matrix may be used over and over again.

Mimeograph is actually a stencil method of printing. When the stencil is typed of cuts as it is called, holes are put in the lacquer sheet when the typewriter strikes it. The stencil is pulled around a cylinder, which contains ink. When the machine is cycled the ink is forced through the holes into the paper. Perhaps you have noticed that mimeograph paper has a rough surface. Mimeograph paper must absorb the ink quickly and not run. Mimeograph is a very popular method of printing. It is fast, economical, and many copies may be obtained. It enjoys wide popularity in schools, institutions and businesses all over the world.

Ditto is a transfer method printing. A stencil is made on a slick sheet of paper from a very greasy carbon, usually purple or green in color. The stencil is placed on the ditto machine and is softened with an alcohol type liquid. The paper is squeezed between the stencil and an impression roller; with some of the carbon from the stencil softened by the alcohol being transferred to the paper. The number of copies is very limited, but it is a fast and cheap method of obtaining a few hundred copies. Unlike mimeo paper ditto has a very slick finish.

Hexagraph is printing from a gelatine base. Only a few copies are possible with this method. First a gelatine mixture is put in a tray and allowed to set. A greasy carbon, such as a ditto stencil is placed in contact with the gelatine and rubbed to give a good transfer on the gelatine. It is then removed and slick paper such as ditto paper is placed against the gelatine, rubbed and then removed; one can only obtain a few copies by this method as each copy gets progressively weaker.

Gold printing or stamping is printing from gold, silver or several other colored foils. Type is set and placed in a stick, and will then be heated. The type is placed against the foil. Heat and pressure causes the foil to transfer on the object. This process is very widely used on the backs of books, photo albums, autograph books, memos, etc. The quality of the foil determines how long the imprint will last.

In these paragraphs I have tried to explain the different types of printing and why we have so many different methods. Each one has its own forte.

The next time you have printing to be done, think which method serves your need best. Also, consider copies required, quality, cost, stock or paper characteristics. There is certainly a method to serve your need.

This Teachers College Journal was printed by letterpress on a 27 by 41 inch Turfing cylinder press. The type was set on a Linotype in 10 point Egmont, a modern roman face. The headings are machine set in Spartan Heavy and subheads in Bodoni Bold. The paper is 70 pound Modern Gloss and the ink is IPI halftone black.

The Impact of a World of Missiles, Rockets, and Satellites on Vocational Education

Melvin L. Barlow

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The great American experiment in education seems forever to be adjusting to the results of technological creativity. Not long after we had become accustomed to motion pictures we were confronted with the reality of radio transmission of speech and music. Shortly thereafter, about the time Lindbergh flew to Paris, motion pictures, speech, and music were combined. In at least one community the first talking picture was the occasion for a school holiday—for all the students were taken in small groups to the theatre to see the first "talkie." Great was to be the impact of these marvels upon education and upon society.

No less astounding were the subsequent creations of technology—missiles that find and destroy their targets, and earth satellites a thousand miles out into space. More astounding yet is the rapidity with which these new technological products enter upon the social scene. The growth, change, development and direction of vocational education has kept pace with the technology—even aiding materially the development of technology. The classes for "buzzer operators" of 1917-18 have become classes for "electronic technicians" today, and almost before we know it, in the immediate future, we will be organizing classes for occupations which are unknown today.

One of the major impacts of technology upon vocational education, is the rapid growth of the trade and industrial program. Another impact of importance is the imperative change in the traditional vocational programs due simply to the changes in the occupations them-

[1] Text of an address delivered Thursday, August 7, 1958 National Leadership Development Conference, Ohio State University

selves. Such impacts reflect the need for more and better qualified students, teachers, and administrative personnel. The need is for students who have a greater desire and capacity to learn, taught by instructors whose craftsmanship rests upon a strong and broad educational base, in an educational environment which is the product of a wise administration. These are the impacts that we see first, that we try to understand, and that we can do something about. But the sociological problems and their relationship to vocational education remain undiscovered.

Toynbee points out that the triumphs of the Industrial Revolution in the technical sphere, notoriously created a host of problems in the economic and social spheres. This he illustrates by comparing the change in the traffic on our roads from primitive vehicles to the modern fast moving vehicles, saying that the change has "created a new challenge in human relations between drivers who, having learned how to annihilate space, have thereby put themselves in constant danger of annihilating one another." This illustration he says, has a symbolic as well as a literal significance.

> It typifies the general change that has occurred over the whole range of our modern Western social life since the emergence of the two dominant social forces of the age: Industrialism and Democrary. Owing to the extraordinary progress which our latter-day inventors have made in harnessing the energies of physical nature and in organizing the concerted actions of millions of human beings, everything that is now done in our society is done, for good or evil, with tremendous drive; and this has made the material consequences of actions and the moral responsibility of agents far heavier than ever before. It may be that in every age of every society some moral issue is always the challenge that is fateful for the society's future; but, however that may be, there is no doubt that it is a moral challenge rather than a physical challenge that confronts our own society today.[2]

Modern writers have raised questions concerning the direction and use to which these unprecedented discoveries will influence mankind. Some writers see a possibility of a bright and glorious future while others fear the possibility that our new power will lead to our own destruction.

> The great new social forces of Democracy and Industrialism have been evoked by a tiny creative minority, and the great mass of humanity still remains substantially on the same intellectual and moral level on which it lay before the titanic new social forces began to emerge.[3]

Change is everywhere apparent and the fact is accepted. But confusion enters the picture because of our inability to identify the nature of the change, the direction and extent to which change should go, and the time elements involved in change. The era of missiles, rockets, and satellites has torn down the Maginot Line which we built around vocational education and which gave us a false sense of security, and of protection from the contaminating influences outside the supposedly impregnable barrier. All of a sudden the force of traffic has cut a six lane turnpike right through the center of our little green acres. The press agents of science and technology turned loose a barrage of propaganda designed to satiate a sensation hungry population. The roaring monster overnight commanded top priority, played to a full house, and the gate receipts were amazing. The need for scientists and engineers became common knowledge and topics of general household conversation.

But there is just a small amount of hot air in this king sized balloon. This earth-shaking roar comes from a mouse with a lion's voice—it is Toynbee's "tiny creative minority" with a loud speaker. By mid 1956, according to the Bureau of Labor Statistics, there were almost twice as many carpenters in the labor force as engineers, and for the same period all of the chemists, physicists, and mathematicians combined did not reach forty-five per cent of the number of plumbers on the occupational scene. There is less than one chance in ten of a youngster actually entering employment in engineering or science when we consider how we distribute ourselves occupationally to perform society's work. The chances are even less than that if we survey the deplorable state of vocational guidance services in the public schools.

Let us return to the problem of change. A part of this problem relates to the normal process of change with which we are thoroughly familiar in vocational education. We learned early in our career about change related to course content so that our instruction was in fact representative of the real life occupations which our students sought. We have perfected to a high degree the skills of meeting this phase of change, and even a TEXAS satellite will cause us no concern.

There is another phase of change which has been accentuated by the advent of a world of missiles, rockets, and satellites which must have in the future a more commanding position in our purview of vocational education. *This is the change which is related to philosophical, psychological, and sociological* concepts. Many of our most urgent problems in the technological age are in reality sociological in nature. We have always recognized the existence of this situation—or perhaps more correctly our founding fathers did—but *we have largely left it up to "George" to provide the appropriate steps in the solution of the problem. Now with our Maginot Line in a* shambles

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[2] Arnold J. Toynbee, **A Study of History,** Abridgement of Volumes I-IV by D. C. Somervell, (New York: Oxford University Press), 1947, p. 206.

[3] **Ibid.,** p. 214

our only line of retreat—happily enough—is one which will add strength to vocational education *because the age of integration is upon us.*

It is not entirely clear just what are the appropriate steps of integration, but a faint suggestion of the nature of integration is discernable. It is quite comfortable to think about the integration of vocational education and its environment in terms of chemical and mechanical analogies. For example, zinc and sulphuric acid may be combined chemically with the result that two entirely new products are formed, neither of which bears any relationship to the original elements. On the other hand if marbles and steel balls are thoroughly mixed together—at normal or moderate temperatures—no chemical combinations take place. The result of this mechanical mixing is that both the marbles and steel balls retain their individual characteristics. It is the mechanical process analogy which assists one to visualize or to philosophize upon the effects and influences which the mechanical mixture makes possible by the close juxtaposition of the two elements. Although we have resisted integration, to a large extent by passive action, we cannot longer ignore the problem. In fact, we could probably promote the best interests of trade and industrial education in the atomic age by vigorous, aggressive action toward integration —but integration of a mechanical type rather than a chemical type with its attendant new products.

Now what specifically is meant by integration of a mechanical mixture type? Although many examples might be suggested, the analogy will be limited to a few. Basically, this means that we ease up just a little on the death grip we have upon some of our earlier principles, procedures and convictions, with a more open minded approach, permit ourselves and our programs to be influenced by other environments—but without losing our principles as in a chemical combination. This isn't "selling out to the enemy," it is a recognition that social changes and technological changes may require that we make some adjustments.

Pleas for vocational education to open its door and fraternize somewhat with the problems in a larger sphere have been made by numerous groups and are to be found in the many publications. This has been going on to some extent, but it probably hasn't become sufficiently widespread or else we wouldn't hear so much about it from our friendly public. Let us look at the problem through the eyes of the Educational Policies Commission and read from the pages of *Manpower and Education.*

> Technological developments and the industrial situation emphasize for the worker the importance of flexibility and cooperativeness, of human relations and personal satisfactions in the occupation as well as in the broader reaches of citizenship and recreational-cultural activity.
> While general and liberal education need to focus attention more clearly on the careers of students, vocational education needs to concern itself increasingly with with the cultivation of humane personal qualities in individuals. As far as the individual student is concerned, general and vocational education have no distinct boundary line separating them. More harmonious integration of general education and vocational education will best serve the interests of individuals and of the nation.[4]

The commission continues with suggestions a bit more specific as follows:

> These factors emphasize for vocational education the importance of personality development, not in any superficial way but in a deeper and fuller sense. Personality development means the cultivation of inner resources, of mental power and emotional health, of balanced outlook and perspective, of widely useful skills, of ability to work on a team, of reliability and integrity and alertness and vision. These qualities, of course, are not easy to develop. They are not now adequately developed by either vocational education or general education alone. They require a balanced and supporting school environment. But unless an upgraded labor force with these qualities can be found, the shortages during the years immediately ahead will be dangerous, and after present shortages are overcome individuals without these qualities will be increasingly handicapped in the competition for careers.[4]

Suffice it to say, without further belaboring the point, that "change" is here to stay, that we need to react—integrate perhaps—before someone does it for us, for it is the "beep" of the satellite which is producing that ringing sensation in our ears.

Another impact of the world of missiles, rockets and satellites on vocational education arises from the imperative necessity to improve quality. Rule out immediately all considerations of quality of the material things of vocational education—the books, machines, supplies, visual aids, course outlines and the like, and devote attention solely to other aspects. The recent Rockefeller Report on education entitled, *The Pursuit of Excellence*, provides some good jumping off points. Now we have every reason in the world to look with pride at the quality of our program, but the meaning of excellence has been upgraded to the point that our previous conception of excellence will bear investigation. What was considered to be good or above reproach by our previous standards may tend to be only mediocre now.

Let us look at a few of the suggestions in the Rockefeller report.

> The most effective educational system can be defeated by a social environment that blunts or destroys aspiration.
> There can be no striving for excellence without models to inspire emulation. There can be no great-

[4] Educational Policies Commission, **Manpower and Education,** (National Education Association: Washington, 1956), pp. 70-71.

ness without the encouragement to ask much of oneself.[5]

Our society calls for the maximum development of individual potentialities *at all levels.*[6]

Fortunately the demand to educate everyone up to the level of his ability and the demand for excellence in education are not incompatible. We must honor both goals. We must seek excellence in the context of concern for all.[7]

No education system can be better than its teachers.[8]

Unused talents lead to personal frustration but they also deprive a society of the mainspring of its vitality. To realize our ideal of maximum personal development, it is not only essential to give them an opportunity to exercise that best. A society must learn to regard every instance of a misuse of talent as an injustice to the individual and injury to itself. And it must cultivate the ideal and the exercise of excellence by every means at its disposal.[9]

Excellent performance is a blend of talent and motive, of ability fused with zeal. Aptitude without aspiration is lifeless and inert.[10]

Assume therefore that our quest to improve quality affects every aspect of our program. We improve the best and the poorest as well. In the search for increased quality, we cannot escape the concept of change, for change may be one of the steps. In other words, we may be up against a stone wall with some aspects of our program and can actually not improve quality of performance without making drastic changes in program. By the same token we should not fool ourselves that change always means improvement in quality.

We could go down a list of all of the major aspects of our program and speculate about how we might pursue new degrees of excellence, and this of course must be done, but not here. However, the opportunity to comment briefly about the pursuit of excellence in teacher training, as one aspect of the total problem of improved quality cannot be neglected. Only a few people would find fault with the thought that the teacher is in a key position to produce quality of production, therefore the quality of the teacher preparation is a major problem. The program of teacher education nation wide is good, but not good enough. We have achieved a degree of understanding through national meetings on teacher training, but we have few evidences of real gains and our experimentation with teacher education has been almost nil.

If teacher educators would teach their classes with 100 per cent efficiency, utilizing all of the knowledge, techniques, insights, and understandings, of which they are capable our program of trade and industrial education would automatically improve. Teacher educators must have some degree of inspiration and drive and one of the first steps in improvement of teacher education would be to remove from the scene the "deadheads" who have retired in teacher educator positions. Then, with the group which is left we must somehow contrive a means for teacher educators to begin really to educate themselves in the larger aspects of teacher education, to shed their prejudices and narrow viewpoints. This means giving up some sacred ideas—and this hurts. Accordingly in California, we are trying a small experiment in teacher education, putting one foot on the next step to see if it rests on a firm foundation, but we should have taken this step ten years ago. We have no choice, we were driven into the situation by the present circumstances. Teacher education programs have tended largely to train teachers in the dull routine aspects of vocational education, and we have more often than not failed to challenge prospective trade teachers intelligently. Only a few come out of teacher education program with a burning desire for intellectual improvement. Most teachers know that the Smith-Hughes Act was official on February 23, 1917, some even know that President Wilson signed the Act at 6p.m. EST, but a very small number of teachers have any real understanding of the social and economic roots of vocational education, and fewer still can interpret these roots in light of present day social and economic mores. We should not stop teaching about the historical and philosophical backgrounds of vocational education, but these should be taught in their appropriate social setting. Most certainly an impact of the age for vocational education must be felt in the teacher education program.

The era of missiles, rockets and satellites has produced a kind of hysteria among us. We feel that we should be in high gear, but we do not know where we are going, or why. We cannot ignore the presence of the impacts of the time and there must be some basis for them, for our literature is full of admonitions. It is as plain as day that somebody ought to do something NOW.

In an eclectic fashion ideas are borrowed to aid thought of the impact of the technological age upon vocational education in terms of three basic phases. First, the problem of integrating our program with the whole of education, but in a manner that permits the identity of vocational education in the final product. Second, the inevitable "change" with which we must be concerned. That we should look forward to change in a manner that would provide us with a fresh outlook and understanding of our future program. Third, the necessity of improving the quality of our program in each of its parts. But who does this? When does it start? The "who" is everyone. When is now. There can be no waiting for someone to blow the whistle. Everyone has a stake in the "new education" of

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[5] Rockefeller Brothers Fund, Inc. **The Pursuit of Excellence Education and The Future of America,** Panel Report V of the Special Studies Project, (Garden City, N. Y., Doubleday & Company, Inc., 1958), p. 19.
[6] **Ibid.,** p. 22
[7] **Ibid.,** p. 23.
[8] **Ibid.,** p. 24.
[9] **Ibid.,** p. 39
[10] **Ibid.,** p. 45.

the future and each must make contributions to the limits of his ability.

Looking back over the treatment of this topic it is evident that but scant attention has been paid to the "How to do" phases. The reason for this is simple. The techniques, skills, and methods which we have so carefully perfected over the years, will transfer with appropriate adjustments to any type of vocational education which will confront us in the future. Furthermore, the leadership needed to convert from the old to the new tasks will surely arise spontaneously. When we discover a new course, one of our number will identify it, set up the objectives of the course, prepare the course outline, course of study, instruction sheets, visual aids, shop and laboratory projects and the many other things which are characteristic of the mechanics of just getting the show on the road. Furthermore, one of our number will have been selected as a teacher. He will be a person who has lived the subject he is to teach, and he will have been instructed in the arts of teaching by a competent teacher educator. The teacher will be supervised by a person wise in the art of supervision and the program will grow, prosper, and contribute an appropriate supply of competent workers in the entry occupations required by the course. A functional advisory committee representative of management, labor, and education will keep the program in the right gear and in the right direction. Appropriate statistical reports will filter through local and state offices to Washington and new marks will be made upon the graphs of progress. The quality of our work as adjustments are made to the conditions of the world of missiles, rockets, and satellites will have our concern, but will we really understand what we have done from the stand-point of the sociological impact upon the lives of men.

Book Review

The Liberal Arts College in America: A Chapter in American Cultural History. By George P. Schmidt. New Brunswick, New Jersey: Rutgers University Press 1957, pp. 310 + viii, $6.00.

Professor Schmidt has made a substantial contribution to an important historical study, namely, higher education here in the United States. And since from the beginning the liberal arts college has been central to our scheme of higher education, Professor Schmidt focuses on it. In the preface he summarizes his book: "The first six chapters depict the age of the old-time college when that institution dominated the educational scene and dispensed the classical tradition from dignified halls of ivy on scores of campuses stretching from Maine to Missouri. This period (1636-1890) lasted until the late nineteenth century, when the single-minded classical college gave way to the emerging complex university. Today in the twentieth century the liberal arts college is trying to maintain its identity and to keep from being smothered by the multitude of professional schools of the dynamic university which surrounds it. This recent development is the theme of the later chapters."

The first six chapters relate an heroic tale of noble effort by noble men and women to bring into being in a raw, semi-barbaric, newly-opened country centers of learning for the shaping of leaders who might make of this strange new land a region dominated by Christian thought and dedicated to lofty purposes. Of these chapters that on "The Old-Time College President" is the most touching and poignant. It is almost a miniature of Senator John Kennedy's *Profiles in Courage* with a cast not of distinguished though forgotten senators but of scholars in presidential chairs —high-minded men abandoning comfortable, well-paid positions in the east to go west or south to carry the gospel of learning to the recalcitrant heathen, often to be repaid with obloquy instead of honor and to go to an early grave broken in health by attempting to do more than any one man can do single handed.

The last six chapters fail to fulfil the promise of the first six. The final chapter, "Academic Freedom," has no organic relationship to the rest of the book. And since it contributes nothing new to that now well-debated and well-understood subject, it might have been deleted to save paper, print, and the reader's time; after all, Senator Joseph McCarthy is really dead now, i.e., both in fact and in theory.

The other five chapters reveal the plight of the cultural historian when he approaches contemporary problems, and in these chapters the reader is made to suffer with the writer who is impaled upon the stake of his own chosen method. Professor Schmidt is a disciple of John Dewey striving to write cultural history, history that is factual, dispassionate, objective. By definition a disciple is a disciple and lives by his master's teachings and is incapable of transcending them. So here, Struggle as he will to straddle the fence of objectivity, to render fully and fairly opposing positions, he can not. The images which emerge from the chapter "Dewey vs. Hutchins" are those of a Hutchins hog-tied to the mediaeval philosopher Aquinas endeavoring to impose a monolithic educational edifice upon us in contrast to a freedom-loving Dewey who would create something resembling the famous "house of many mansions" wherein is to be found salvation for each and all. This struggle of the professor with himself would be amusing if the subject were not so serious.

Thus it is that the history of the liberal arts college in the twentieth century will have to be rewritten by someone more competent than Prof. Schmidt. The question which he proposed in his preface to discuss in the last chapters, namely, whether the liberal arts college has maintained its identity or whether it has been smothered by the multitude of professional schools which surround it, is a large question which he does not begin to answer. In fact he never really gets to it. He never clearly defines this "identity" which can be lost or smothered, and it is not until one reaches the next to last page of the last chapter (p. 241) that one discovers that the author himself is wonderfully confused. The liberal education he conceives is a heterogeneous agglomeration of unrelated elements, and to illustrate I quote his definition in full: "A liberal education means knowledge: verified and dependable information about the world of nature and its processes, and about human society both in its historic origins and its ever-changing contemporary forms. It means trained skills and abilities: to use one's own language effectively and one or more foreign languages adequately; to think critically—itself a cosmos of more specific skills; to judge intelligently among alternatives; to participate helpfully in social situations. It means appreciation of people; of the moral and spiritual quality of actions; of human imagination whether displayed in painting or music, in poetry or drama, or in mathematics, astronomy, or physics." The mind reels beneath the cumulative weight of these superimposed cliches. Could anything be more inchoate, pluralistic, heterogeneous? How does a professor or a faculty teach "a cosmos of specific skills"? What can be the meaning of such a cant expression as "to participate helpfully in social situations"? Or again, liberal education "means appreciation of people," is the kind of academic blubber which the professor himself condemns and sneers at on earlier pages. And if the blurry image of the liberal arts college which attempts to live by this creed is a true image of a present-day liberal arts college, then the reader is forced to conclude that this kind of educational institution has indeed lost its identity, has been smothered by the professional colleges which surround it, is the kind of college which produces the butterfly mind, and that it ought in the name of right reason to be abolished as having lost its *raison d'etre*.

When it is written, the cultural history of the liberal arts college of the first half of this century will not resemble the bright, gay, optimistic picture presented in this book. It will be a much more somber and thoughtful document which will probe deeply into the sense of guilt that afflicts so many liberal arts faculties; it will show up the hypocrisy of some brightly printed and beautifully illustrated catalogues; it will contain specific answers to the question why some liberal arts colleges are liberal in name only, why some have closed their doors, and why some continue to send into our society an annual stream of worthy, thoughtful men and women.

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